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LOWER RIVER RD., P.O. BOX 248, CHARLESTON, TN 37310

June 5, 1993

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HAND DELIVERED

Cheryl W. Smith
Senior Remedial Project Manager
United States Environmental Protection Agency
345 Courtland Street Northeast
Atlanta, Georgia 30365

Re: Transport Modeling and Potential Soil Action Levels
Olin Chemicals/McIntosh Plant Site
McIntosh, Alabama

Dear Ms. Smith:

Per the request in your letter of May 17, 1993, enclosed are five copies of the modeling study and potential soil action levels for the areas identified as potential continuing sources of groundwater contamination at the subject site. The study was prepared for Olin by Woodward-Clyde Consultants, Baton Rouge, LA. The rest of this cover letter discusses these potential soil action levels as they apply to the site.

During our teleconference of May 19, Olin made the point that soil action levels appeared unnecessary because the risk level and hazard index resulting from exposure to contaminated soils and groundwater are less than 10^{-6} and 1.0 respectively. Olin is in compliance with the pre-existing RCRA Post-closure Operating Permit, which requires us to meet maximum contaminant levels (MCLs), and with EPA's own CERCLA acceptable risk range. We continue to take the position that these are important points. EPA commented during the teleconference that risk assessment did not address subsurface soils and time to achieve MCLs using the pump-and-treat system in place may be lengthy. Based on the first part of EPA's comment, Olin agreed to conduct modeling and recommend potential soil action levels, and these are being submitted with this letter.

Regarding the latter part of EPA's comment, the RCRA Permit contemplates 25 to 27 years to reach MCLs. If reasonable progress is not being made toward that goal, then the RCRA Permit process is the means to accelerate it. This would appear to be the path consistent with the EPA Waste Management Division Director's letter of April 10, 1991, to Olin regarding coordination between RCRA and CERCLA requirements. The

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RCRA corrective action system should be the very foundation of the Record of Decision (ROD), and is fully protective of human health and the environment for OU-1 groundwater at McIntosh.

Olin believes models are useful tools to study the effects of a wide range of soil- and chemical-specific variables on the fate and transport of contaminants. Model results must be interpreted by qualified professionals as model results, recognizing that fate and transport models are not reality. The model results are specific to the area modeled, they cannot be applied to other areas of the site because of significant differences in soil- and chemical-specific factors among different areas.

The models of course are only as good as the input data. In many cases, site-specific or literature data for a given input are highly variable and a choice must be made as to which value to use. Woodward-Clyde has chosen what they believe to be an appropriate, technically-correct value in these instances. Since it is a choice, it is obviously open to discussion. Olin's position on this is that it is inappropriate to select the value that produces the lowest soil action level each and every time a choice must be made. These choices are by definition variables and consistently choosing the "worst-case" value for each variable has the effect of piling safety factor upon safety factor, resulting in a model result that has no relationship to the real world. Olin believes we should work to make the models simulate the fate and transport as best we can, and not work just to get the lowest soil action level possible.

At your suggestion, we discussed modeling with Ciba Corporation and their consultant, BCM, and reviewed the modeling report that Ciba submitted to EPA for their NPL site immediately north of Olin's site. In choosing input values where there was a range in site-specific or literature data, we used the same values that EPA approved for Ciba's modeling where there was sufficient similarity between the areas being modeled. We appreciate your suggestion; Ciba and BCM were very helpful.

One obvious question is how to apply the recommended potential soil action levels to soil data from the areas modeled. There are some single sample points where the soil concentration exceeds the recommended potential soil action level. Olin believes that EPA must review all data in soils adjacent to, and especially below, the single value, consider the spatial variation in the data, and assess the overall situation. Considering all factors in this manner will lead to a conclusion that the single values are unrelated to any groundwater exceedances of the MCLs and will not require any remedial action.

In summary, EPA has requested that Olin submit a modeling study and recommended potential soil action levels for the McIntosh site. Olin is submitting these today. We

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Olin CHEMICALS
LOWER RIVER RD., P.O. BOX 248, CHARLESTON, TN 37310

want to reiterate that we believe that any contaminants released from soils are being addressed by the RCRA Corrective Action Program, under which Olin is required to achieve MCLs. Any consideration of further remedial action to achieve MCL-related ARARs in groundwater at McIntosh must consider this.

Please let me know if you have any questions regarding this submission or if you would like to meet to discuss it or any of the work in progress at McIntosh, Alabama.

Sincerely,

OLIN CORPORATION

J. C. Brown
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Manager, Environmental Technology

\jcb
Enclosure

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1.0

INTRODUCTION

Olin Corporation is conducting a Remedial Investigation/Feasibility Study (RI/FS) at its McIntosh, Alabama facility under the oversight of the U. S. Environmental Protection Agency (EPA). The Draft FS Report was submitted to EPA on May 5, 1993. The draft FS outlined remedial alternatives for subsurface soils in areas that were identified as potential continuing sources of groundwater contamination. In a correspondence from Ms. Cheryl Smith of EPA to Mr. J. C. Brown of Olin dated May 17, 1993, EPA requested that Olin submit soil action levels for these areas. This report presents the analysis and results of contaminant transport modeling performed to develop soil action levels for the Olin McIntosh site.

1.1 OBJECTIVE

The objective of this analysis was to develop conservative potential soil action levels such that the concentration of leachate percolating through the soils to the groundwater would not cause exceedences of the potential applicable or relevant and appropriate requirements (ARARs) for groundwater. The Safe Drinking Water Act maximum contaminant levels (MCLs) and non-zero maximum contaminant level goals (MCLGs) have been identified as potential ARARs for groundwater at the site. In the analysis, conservative assumptions were made such that the soil action levels developed are lower than levels required to protect groundwater.

1.2 SITE CONDITIONS

Two groundwater aquifers underlie the site: a shallow Alluvial Aquifer (down to 100 feet below grade) and a deep Miocene Aquifer (below 180 feet). The two aquifers are separated by a thick clay layer. Olin has operated a pump-and-treat Resource Conservation and Recovery Act (RCRA) corrective action program (CAP) since 1987 to remove contamination from the Alluvial Aquifer. The Alluvial Aquifer is generally unconfined throughout the area. Based on single well response tests, the horizontal hydraulic conductivity of the Alluvial Aquifer was estimated to be between 4 ft/day and

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40 ft/day. The calculated hydraulic conductivity from a pumping test was 578 ft/day (ERM, 1989). The potentiometric data show that Olin's corrective action program is effective at controlling migration of contaminants from known past or current sources.

The remedial investigation indicated that the old plant (CPC) landfill may be a continuing source of groundwater contamination to the Alluvial Aquifer. The RI sampling data also indicated a potential for semivolatile organic constituents to be carried down by infiltration to the unsaturated sands above the Alluvial Aquifer in the area to the west of the former CPC plant area. Soil action levels were developed for these two areas. Because soil and contaminant characteristics vary widely over the site, the potential soil action levels are applicable only to the area for which they are developed.

1.2.1 Old Plant (CPC) Landfill

The site of the old plant (CPC) landfill (Figure 1-1) was utilized from 1954 until 1972 to neutralize acidic wastewater from CPC plant operations. Plant personnel have indicated that the former landfill also received organic wastes from the CPC plant consisting of hexachlorobenzene and trichloroacetonitrile residue. From 1972 to 1977 the site was used for disposal of general plant debris such as paper, cardboard, wood, small metal containers, scrap plastic and rubber items from the entire plant. The landfill area is approximately 300 x 400 feet. In 1977, prior to RCRA, the landfill was closed with a clay cap, topsoil, and grass, as approved by the Alabama Department of Environment Management (ADEM). The cap was upgraded in 1984 with a 2-foot-thick layer of compacted clay, 3 to 6 inches of topsoil and a vegetated cover.

Boring logs from four soil borings completed in the old plant (CPC) landfill area are presented in Appendix A. The water table in this area occurs at a depth of about 40 feet. The lithologic descriptions from these borings indicate that the landfill area is overlain by topsoil and a 2- to 4-foot-thick clay cap. Silty clay fill material from about 4 to 12 feet thick, was encountered beneath the clay cap in each of the borings. This fill layer contains residue of the waste that was disposed of in the landfill. Shell, rock and wood fragments were found throughout the fill. Saturation at the base of the fill/waste layer was apparent in three of the four borings. The most distinct saturated layer was

encountered in the northwest corner of the landfill where approximately 9 feet of very wet, loose silt/clay, with little or no apparent strength, was found beneath the fill/waste material. A stiff, gray, red and brown clay ranging from 3 to 17 feet thick was encountered beneath the fill/waste and saturated zones in all borings. Each boring penetrated 20 feet into the reddish yellow, fine-to-coarse-grained unsaturated sand above the Alluvial Aquifer. The sand was described as damp to wet at the base of the borings. Total depths for the four landfill borings ranged from 40 to 48 feet below ground surface.

Tables 1-1 and 1-2 present the results of chemical analyses of samples from the old plant (CPC) landfill soils. These are summarized below:

- The organic compounds detected in the fill/waste material are predominantly chlorinated benzenes (chlorobenzene, the dichlorobenzene isomers, 1,2,4-trichlorobenzene, 1,2,4,5-tetrachlorobenzene, and hexachlorobenzene). Hexachlorobenzene concentrations in the fill/waste samples ranged from 13 mg/kg to 170 mg/kg, with an average of 78 mg/kg. The tentatively identified compounds (TICs) pentachlorobenzene and pentachloronitrobenzene were also reported in the samples. Based on the Phase III analytical results, the fill/waste zone generally contains less than 0.1 percent chlorinated organics.
- The results of an analysis of this silt/clay were similar to the fill/waste analytical results.
- Analyses of samples from the base of the clay indicated that volatile organic compounds were more common in the clay than the overlying fill/waste material. The target semivolatile chlorinated benzenes were reported (at concentrations up to 74 mg/kg) in clay samples from the two western borings and were not reported in the clay samples from the two eastern borings.

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- The organics detected in the unsaturated sands above the Alluvial Aquifer material included chlorobenzene, the dichlorobenzene isomers, chloroform, benzene, 1,1-trichlorobenzene, 1,2,4,5-tetrachlorobenzene, 1,2,4-trichlorobenzene, hexachlorobenzene, and phenol. Similar to the data from the clay samples, there were distinct lateral variations in the reported concentrations in the unsaturated sands above the Alluvial Aquifer, with greater concentrations in the western borings than the eastern borings.
- Mercury was detected in three of the four landfill fill/waste samples, at concentrations ranging from 21.7 mg/kg to 406 mg/kg. A low mercury concentration (0.42 mg/kg) was reported in the loose silt/clay sample. Mercury was found in only one of the five clay samples, at a concentration of 0.62 mg/kg, and was not detected in any of the eight sand samples. The inorganic constituents other than mercury were reported at concentrations generally within a range commonly found for naturally occurring soils.

1.2.2 Former CPC Plant

Two soil borings were completed at the western and southern boundaries of the former CPC plant area during the RI. The boring logs are presented in Appendix A. The borings encountered 10 to 12 feet of clay overlying unsaturated sands and silts above the Alluvial Aquifer. The boring to the south of the plant was completed to a depth of 20 feet; the one to the west of the plant was completed to 32 feet. Groundwater was not encountered in either of the borings. The water table in this area generally occurs at a depth of about 32 feet.

Table 1-3 summarizes the analytical results from the CPC plant area borings. The results of the boring completed to the south of the plant area indicate low concentrations of constituents in the clay and no organic compounds were detected in the unsaturated sand above the Alluvial Aquifer. The primary constituent found in the soils west of the former CPC plant area were semivolatile tetra-, tri-, and di-chlorinated benzenes. The affected soils to the west of the former CPC plant are assumed to extend northward to

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the railroad tracks and westward to the road (or about 27,500 square feet). The constituents are present mainly in the upper clay, and groundwater in this area is generally greater than 30 feet below ground surface. The data showed a distinct decrease in concentrations with depth.

1.2.3 Soil Action Level Constituents

Table 1-4 lists the groundwater chemicals of potential concern from the baseline risk assessment that was conducted as part of the draft RI (WCC, 1993). Potential soil action levels were evaluated for a subset of this list, which was developed based on the relative concentrations in the soils and the fate and transport properties, as described below.

Four volatile constituents are listed as chemicals of potential concern (benzene, bromodichloromethane, chlorobenzene and chloroform). Potential soil action levels were developed for benzene and chlorobenzene. The other volatile constituents were either not detected or detected at very low concentrations (< 0.5 mg/kg) in the soil samples from the old plant (CPC) landfill area and the former CPC plant area.

Six semivolatile constituents are listed as chemicals of potential concern. Soil action levels were developed for 1,2,4-trichlorobenzene and the three dichlorobenzene isomers. The other two, pentachlorobenzene and pentachloronitrobenzene are significantly less mobile due to their lower solubility and higher Koc values. Similarly, the one pesticide constituent on the chemicals of potential concern list (alpha-BHC) has low mobility as indicated by a low solubility and high Koc, and potential soil action levels were not developed for this compound.

Mercury was the only inorganic constituent detected in the soils from the old plant (CPC) landfill area above a concentration commonly found for naturally occurring soils. Consequently, mercury was the only inorganic constituent for which a potential soil action level was developed for this area. Concentrations of inorganic constituents detected in the soil samples from the former CPC plant area were all within a range commonly found for naturally occurring soils and soil action levels for inorganic constituents were not developed for this area.

The following table summarizes the constituents for which soil action levels were developed and their respective MCLs. An MCL has not been finalized for 1,2,4-trichlorobenzene and the MCLG is listed.

Soil Action Level Constituents	MCL or MCLG ($\mu\text{g/l}$)
Benzene	5.0
Chlorobenzene	100
1,2,4-Trichlorobenzene	70 ¹
1,2-Dichlorobenzene	600
1,3-Dichlorobenzene	600
1,4-Dichlorobenzene	75
Mercury ²	2.0

NOTES:¹ MCLG² Potential soil action levels for mercury were only developed for the old plant (CPC) landfill area.

TECHNICAL APPROACH

Development of potential soil action levels involved the following four steps 1) estimation of a concentration reduction factor (CRF) due to migration of potential groundwater chemicals of concern through the unsaturated zone; 2) estimation of a concentration reduction factor due to near-field mixing of constituents in the Alluvial Aquifer; 3) back-calculation of allowable leachate concentrations using the values obtained in steps 1 and 2 and the groundwater MCLs or MCLGs; and 4) estimation of potential soil action levels based on the estimated allowable leachate concentrations, chemical-specific factors and soil properties.

The general approach used is that rainwater percolating through a source (soil containing contaminants) would generate leachate by partitioning of the contaminants from the soil to the water. Soil action levels are theoretical soil concentrations at the source that would generate sufficient leachate to cause exceedences of the groundwater MCLs or MCLGs. The analyses were conducted for two source intervals in the old plant (CPC) landfill, the upper fill/waste and clay material, and the underlying unsaturated sand. The contaminated materials in the upper 14 feet (i.e., 4 to 14 feet) were considered the source for the former CPC plant area.

Two one-dimensional, publicly available contaminant transport models were used to estimate concentration reduction factors for migration through the unsaturated zone, and the results were compared. Models are useful tools to study the effect of variations in the wide range of soil and chemical properties specific to an area. Model results should be interpreted by qualified professionals familiar with site-specific factors. Using two models provided additional insight on the validity of the analyses. The models, PESTAN (CSMS, 1992) and SOLUTE (IGWC, 1991), consider advection, longitudinal dispersion, linear adsorption and natural decay (e.g., biodegradation) through the soil column. The source concentration for SOLUTE was selected as unity and the concentration at the top of the aquifer was expressed as a fraction of the source concentration. For PESTAN, the concentration in the leachate at the source was estimated to be the chemical-specific

aqueous solubility and the model estimated the resulting concentrations at the base of the unsaturated zone.

In addition to estimating the attenuation in the unsaturated zone using the SOLUTE and PESTAN models, a mass balance equation/model was used to estimate the reduction in concentrations due to the near-field mixing of the contaminants in the Alluvial Aquifer. This analysis is equivalent to the Summer's model (Summer et al., 1980).

The unsaturated zone transport analyses and near-field mixing were used in combination with the allowable concentrations in the groundwater (MCLs and MCLGs) to back-calculate the potential soil action levels. The relationships between soil and liquid concentrations were calculated from chemical-specific sorption coefficients (K_d), dimensionless Henry's Law constant (H) and soil-specific properties. Figures 2-1 and 2-2 show the conceptual approach for estimating the soil action levels for both the SOLUTE and PESTAN analyses.

Soil action levels for the unsaturated sand in the old plant (CPC) landfill area were estimated with the Summer's model approach considering only near-field mixing of contaminants within the Alluvial Aquifer (i.e., no attenuation in the unsaturated zone). This is a very conservative approach and would only be applicable for the sand directly above the Alluvial Aquifer.

Details of the PESTAN and SOLUTE model analyses are described in Sections 2.1. and 2.2, respectively. The near-field mixing analysis, or Summer's model, is described in Section 2.3. The calculations used to estimate soil action levels are described in Section 2.4.

2.1 SOLUTE MODEL

One-dimensional vertical transport through the unsaturated zone was simulated using the publicly available model, SOLUTE (IGWMC, 1991). This model was developed by the International Ground Water Modeling Center and is based on the van Genuchten and Alves' (1982) analytical solution to the one-dimensional transport problem. SOLUTE has the capability to simulate contaminant migration from an exponentially decreasing

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finite source concentration due to one-dimensional uniform advection, longitudinal dispersion, linear reversible adsorption, and first-order decay of the chemical.

Transport simulations were conducted in the transient mode to estimate the peak concentration at the bottom of the unsaturated zone relative to the initial concentration at the source. The contaminant source consists of a finite contaminant mass in the soil that is released over time due to recharge. Thus, the source concentration reduces over time. Based on a mass balance approach similar to the continuous flushing model described by the U.S. EPA (1988), the source can be expressed as an exponentially decreasing concentration:

$$C_w(t) = C_o \exp(-\beta t) \quad (2-1)$$

where:

- $C_w(t)$ = the aqueous source concentration (mg/l) at time = t (d)
 C_o = the maximum initial source concentration (mg/l)
 β = exponential source concentration reduction rate (d^{-1})

The derivation of the constant β is based on mass balance considerations and accounts for linear adsorption of the chemicals to soil particles and the vertical recharge rate. The expression for β is approximated by:

$$\beta = I/(\theta_w dR) + \lambda \quad (2-2)$$

where:

- I = the recharge rate (m/d)
 θ_w = the volumetric water content of the soil (cc/cc)
 d = the thickness of the contaminated source (m)
 R = the chemical-specific retardation factor (unitless)
 λ = the chemical decay rate constant [d^{-1}] (assumed zero for source decay)

The retardation factor, R, is the ratio of seepage velocity to contaminant migration velocity due to linear adsorption. For the unsaturated zone, R can be approximated as:

$$R = 1 + \frac{\rho_b K_d}{\theta_w} + \frac{(\theta - \theta_w) H'}{\theta_w} \quad (2-3)$$

where:

- ρ_b = the bulk density of the soil (g/cc)
- K_d = the sorption coefficient (g/g/g/cc)
- θ = saturated water content (total porosity) (cc/cc)
- θ_w = the volumetric water content (cc/cc)
- H' = the dimensionless Henry's Law Constant

Note when the soil is saturated, the saturated water content $\theta = \theta_w$ and Equation 2-3 reduces to:

$$R \approx 1 + \rho_b K_d / \theta \quad (2.3a)$$

For organic constituents the sorption coefficient, K_d , was estimated by using the expression provided in U.S. EPA (1989):

$$K_d = K_{oc} f_{oc} \quad (2-4)$$

where:

- K_{oc} = the normalized chemical-specific organic carbon partition coefficient (g/g/g/cc)
- f_{oc} = the fractional organic carbon content of the soil (unitless)

For mercury, the sorption coefficient was estimated using the following relationship between Kd and pH provided in Loux et al. (1990):

$$\log K_d = 0.122 \times pH + 1.42 \quad (2-5)$$

Using the estimated source reduction rate, β , and other necessary parameters based on site-specific data (discussed in Section 3.0) such as the vertical seepage velocity and longitudinal dispersivity, the SOLUTE program was implemented to estimate concentration over time at the base of the unsaturated zone. From these results, the peak concentration, C_1 , was estimated and a concentration reduction factor (CRF_1) for transport through the unsaturated zone was defined as:

$$CRF_1 = C_o/C_1 \quad (2-6)$$

For this (SOLUTE) analysis, the aqueous concentration at the source, C_o term was assumed to be unity so that CRF_1 could be expressed as a fraction of the source concentration.

2.2 PESTAN MODEL

The PESTAN (Pesticide Analytical) model is a computer code for estimating the transport of constituents through soil to the groundwater. The model is based on a closed-form analytical solution of the advective dispersive transport equation. The model simulates the movement of a "slug" of contaminated liquid migrating through a homogeneous soil column. Once the slug enters the soil, contaminant transport is influenced by sorption, dispersion and loss of mass by liquid-phase decay and migration out of the soil column.

The PESTAN model estimates the concentration in the liquid phase as a function of depth for a total pollutant mass of the "slug" applied per unit area (M_s). For site-specific application, the mass of the "slug" was estimated based on site-specific data. The model assumes that the mass is distributed uniformly throughout the specified area (A) and thickness (d) at a concentration C_s . The area and thickness were estimated from the soil

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sampling data. The mass per unit area was then calculated for selected source concentrations using the following equation:

$$M_a = d \rho_b C_s \times 1 \times 10^6 \text{ mg/kg} \quad (2-7)$$

where:

M_a	=	mass per unit area at the source (kg/m^2)
ρ_b	=	the bulk density of the soil (kg/m^3)
d	=	thickness of the contaminated source (m)
C_s	=	source concentration (mg/kg)

The PESTAN model uses the following assumptions:

- Leachate concentration equals the maximum possible concentration, i.e., aqueous solubility (a very conservative assumption).
- The slug enters the soil at the steady state velocity equal to that of the pore-water. This velocity is the ratio of recharge rate to the pore-water content.
- Linear isotherms describe the partitioning of the pollutant between the liquid and solid phases.
- The water content is related to the hydraulic conductivity as described by Campbell (1974):

$$\frac{K}{K_{sat}} = \left(\frac{\theta_w}{\theta} \right)^{2b+3} \quad (2-8)$$

where:

- K = the hydraulic conductivity at a volumetric water content (m/d)
b = the characteristic curve coefficient for the soil (unitless)
 K_{sat} = the hydraulic conductivity at the saturated water content (m/d)
 θ = saturated water content or total soil porosity (cc/cc)
 θ_v = volumetric water content (cc/cc)

The original paper detailing the model theory is presented in Enfield et al. (1982).

2.3 NEAR-FIELD MIXING IN THE AQUIFER

As contaminants enter the Alluvial Aquifer, they will mix with the water flowing through the aquifer. The contaminants penetrate the aquifer and spread vertically beneath the source area due to the combined effects of vertical dispersion and vertical velocity of the recharge. Vertical spreading and mixing was simulated using a mass balance near-field mixing algorithm that is analogous to the approach used by U.S. EPA in the EPA's Composite Model for Landfill (EPACML, 1990) model. This well publicized and publicly scrutinized algorithm (noticed in the Federal Register) estimates the penetration depth, H, by adding the thickness of the plume due to the effects of vertical dispersion and vertical recharge rate:

$$H = (2\alpha_v L_b)^{1/2} + B(1 - \exp[-L_b J/(VB)]) \quad (2-9)$$

where:

- H = contaminant penetration depth (m)
 α_v = the vertical dispersivity in the Alluvial Aquifer (m)
 L_b = the horizontal length of the plume at the bottom of the unsaturated zone (m)
I = the vertical recharge rate (m/d)
B = the thickness of the Alluvial Aquifer (m)
V = the Darcy velocity in the Alluvial Aquifer (m/d)

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Note L_b is the horizontal length parallel to the flow direction, and is equal to the characteristic length of the source. If the computed value of H is equal to or larger than the thickness of the aquifer, it is assumed to be equal to the thickness.

Using the principle of mass balance and assuming a uniform vertical concentration over the penetration depth and in the transverse direction over the width of the source, the concentration reduction factor (CRF_2) for near-field mixing can be expressed as:

$$CRF_2 = C_1 / C_2 = VA_1 / IA_2 \quad (2-10)$$

where:

- C_1 = peak concentration at top of Alluvial Aquifer (mg/l)
 C_2 = the average concentration over the contaminant penetration depth (mg/l)
 A_1 = cross-sectional area of groundwater flow (m^2)
 A_2 = source surface area (m^2)

Near-field mixing is a function of the area modeled and therefore the same CRF_2 were used with SOLUTE and PESTAN models.

2.4 ESTIMATION OF THE SOIL ACTION LEVELS

The approach for developing soil action levels from the analysis of migration through the unsaturated zone and near-field mixing within the Alluvial Aquifer is described in Sections 2.4.1 and 2.4.2 for the SOLUTE and PESTAN models, respectively. The approach for estimating soil action levels for the unsaturated sand in the old plant (CPC) landfill area is described in Section 2.4.3.

2.4.1 SOLUTE Model

For the SOLUTE model approach, the individual concentration reduction factors were used to develop an overall concentration reduction factor (CRF_T) as:

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$$CRF_T = CRF_1 \times CRF_2 \quad (2-11)$$

Based on the estimated overall concentration reduction factor, the allowable leachate concentration was estimated using the following:

$$C_{TARGET} = C_{All} \times CRF_T \quad (2-12)$$

where:

C_{TARGET} = target concentration in the aqueous phase at the source (mg/l)
 C_{All} = allowable concentration in groundwater, which is equal to the MCL or MCLG (mg/l)

The potential soil action level concentration on a set weight basis was then estimated as:

$$C_{Sal} = C_{TARGET} \times Ad \quad (2-13)$$

where:

C_{Sal} = potential soil action level (mg/kg)
A = the Adsorption factor estimated using:

$$Ad = \frac{\theta_w + \rho_b K_d + (\theta - \theta_w)H'}{(\theta_w \rho_w + \rho_b)} \quad (2-14)$$

where:

H' = Henry's law coefficient (dimensionless).
 ρ_w = the density of water (g/cc) and all other symbols have been defined above.

2.4.2 PESTAN Model

For the PESTAN model, the allowable concentration at the top of the Alluvial Aquifer, C_1 , was calculated based on the near-field mixing concentration reduction factor (CRF_2) and the MCL (C_{All}) as follows:

$$C_1 = C_{All} \times CRF_2 \quad (2-15)$$

In order to estimate the allowable soil concentrations, the PESTAN model was run to estimate time versus concentration curves at the water table for the different source masses per unit area. From these curves, the allowable source mass per unit area (M_{All}) was estimated as the mass that resulted in a curve where the peak concentration value was less than or equal to the allowable concentration at the top of the Alluvial Aquifer after near-field mixing (i.e., $C_1 \leq C_{All} \times CRF_2$). This allowable source mass was then used to estimate the soil action levels using:

$$C_{Sal} = \frac{M_{All}}{(\rho_b) d} \times 1 \times 10^6 \text{ mg/kg} \quad (2-16)$$

where:

- M_{All} = the allowable source mass (kg/m^2)
 d = thickness of source (m)
 ρ_b = the bulk density of soil (kg/m^3)

Data used and results of the application of the SOLUTE and PESTAN models are presented in Section 3.0.

2.4.3 Summer's Model

Potential soil action levels for the unsaturated sand immediately above the aquifer in the old plant (CPC) landfill area were estimated with the Summer's model approach

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considering only near-field mixing of contaminants within the Alluvial Aquifer (or CRF₂) as follows:

$$C_{TARGET} = C_{AU} \times CRF_2$$

and:

$$C_{Sal} = C_{TARGET} \times Ad$$

Because attenuation in the unsaturated zone was not considered, these potential soil action levels would only be applicable for the sands directly above the Alluvial Aquifer.

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MODEL INPUT DATA

This section describes the input data used in the implementation of the approach presented in Section 2.0. Input data are divided into the following categories and discussed in Sections 3.1, 3.2 and 3.3:

- Source data
- Subsurface data
- Chemical specific data

3.1 SOURCE DATA

The source data describe the characteristics of the contaminant source from the old plant (CPC) landfill and former CPC plant area. The mass of each constituent was estimated for both potential source areas. These mass calculations are presented in Appendix B and summarized in Table 3-1. The source input data for PESTAN and SOLUTE are summarized in Table 3-2.

Old Plant (CPC) Landfill. The constituents in the soils underling the old plant (CPC) landfill are contained in the fill/waste material as well as the underlying clay and sand as shown in Table 3-1. For the purpose of this analysis, two intervals (upper and lower) were designated as potential sources. Potential soil action levels were developed separately for each interval. The upper source interval, a combination of the fill/waste and clay, includes the upper 23 feet (7 m) of soil. The lower source interval was designated as the unsaturated sand above the Alluvial Aquifer. Potential soil action levels were developed for the upper source interval considering attenuation in the unsaturated zone by PESTAN and SOLUTE and near-field mixing within the Alluvial Aquifer. For the lower source, conservative potential soil action levels were developed by only considering near-field mixing.

The initial aqueous concentration at the source, C_0 , for the SOLUTE model was selected as 1.0 so that attenuation in the unsaturated zone could be expressed as a fraction of the

source concentration (i.e., the resulting calculated transport concentration ratios are expressed directly as decimal fractions of the source concentration).

For PESTAN the allowable mass in the slug was calculated using the procedure described in Section 2.2. The allowable source mass, M_{All} was estimated as the mass that resulted in the peak leachate concentration C_1 value less than or equal to the allowable concentration at the top of the Alluvial Aquifer (C_{All}) as discussed in Section 2.2. The PESTAN model assumes that the mass leaches at the chemical-specific aqueous solubility.

Former CPC Plant Area. For both the SOLUTE and PESTAN models, the source area for the western portion of the former CPC plant area was assumed to be from 4 feet below ground surface (bgs) to 14 feet bgs (3.05 m), which is where most of the contaminants were detected. The estimated affected area (A_2), as described in the draft FS, is 27,500 square feet (2,555 square meters). The initial source concentration for SOLUTE was selected as 1.0 (i.e., the resulting calculated transport concentration ratios are expressed directly as decimal fractions of the source concentration). The source mass for PESTAN was calculated as discussed above.

3.2 SUBSURFACE DATA

Subsurface data include hydrogeologic properties for the unsaturated zone and the Alluvial Aquifer. These data are summarized in Table 3-3.

Unsaturated Zone Properties

The unsaturated zone properties that were used for the PESTAN and SOLUTE models include:

- Infiltration rate (I)
- Saturated hydraulic conductivity (K_{sat})
- Saturated water content or total porosity (θ)
- Bulk density of soil (ρ_b)
- Characteristic curve coefficient (b)

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- Volumetric water content (θ_w)
- Transport distance (L)
- Seepage velocity in the unsaturated zone (V_s)
- Longitudinal dispersivity (α_L)
- Fractional organic carbon content of the soil (f_{oc})

PESTAN uses input values of infiltration rate, saturated hydraulic conductivity, characteristic curve coefficient, and saturated water content to estimate the volumetric water content and the seepage velocity. This estimated seepage velocity is used by PESTAN for contaminant transport calculations and is an input for the SOLUTE model.

Infiltration Rate. The annual infiltration rate was estimated from the Hydrologic Evaluation Landfill Performance (HELP) model (EPA, 1992). The HELP model calculations indicated an infiltration rate of 5.25×10^{-4} ft/d (1.60×10^{-4} m/d) in the old plant (CPC) landfill area. An infiltration rate of 7.31×10^{-4} ft/d (2.22×10^{-4} m/d) was estimated for the former CPC plant area. The calculation for the old plant CPC landfill was for infiltration through a recompacted clay layer, whereas uncompacted natural soil was assumed for the former CPC plant area.

Saturated Hydraulic Conductivity. The vertical saturated hydraulic conductivity in the old plant (CPC) landfill area was estimated from literature values typical of silt, 0.28 ft/d (0.0853 m/d). This is considered conservative (i.e., high) because flow through the unsaturated zone would be controlled by the layer which has the lowest hydraulic conductivity. The old plant (CPC) landfill has been capped with clay and there is clay between the fill/waste material and the sand.

The saturated hydraulic conductivity was estimated as 30 ft/day (9.14 m/day) for the former CPC plant area, or one-tenth of the horizontal hydraulic conductivity of the underlying Alluvial Aquifer.

Saturated Water Content. The saturated water content was assumed to be 0.40 for the old plant (CPC) landfill, which is a typical saturated water content (i.e., porosity) for a silt based on published values in (Driscoll, 1986). This value is consistent with the

selected hydraulic conductivity value. A saturated water content of 0.35 was used for the former CPC plant, a typical value for a sand based on published values (Driscoll, 1986).

Bulk Density. The bulk density of soil (weight of dry soil divided by the field or net volume of soil) was calculated from the relationship.

$$\rho_b = \rho_s (1 - \theta) \quad (3-1)$$

where:

- | | | |
|----------|---|---|
| ρ_b | = | bulk density of soil (g/cc) |
| ρ_s | = | particle mass density (g/cc) |
| θ | = | porosity or the saturated water content (cc/cc) |

The particle mass density was estimated to be 2.65 g/cc (Freeze and Cherry, 1979).

Characteristic Curve Coefficient. The characteristic curve coefficient (b) is a dimensionless empirical value (Clapp and Hornberger, 1978) that relates the relative saturation of soil to the relative hydraulic conductivity under steady-state conditions. This coefficient was estimated from tabulated values presented with the PESTAN Version 4.0 program documentation (CSMS, 1992) and are dependent on the soil type. A characteristic curve coefficient of 5.0, typical of silt, was used for the old plant (CPC) landfill. A coefficient of 4.0, typical of a sand, was used for the former CPC plant area.

Volumetric Water Content. As discussed in Section 2.1, PESTAN calculates the volumetric water content. For the old plant (CPC) landfill, the calculated volumetric water content was 0.254. A value of 0.133 was calculated for the former CPC plant area.

Transport Distance. The transport distance from the upper source to the Alluvial Aquifer in the old plant (CPC) landfill area was assumed to be 22.4 feet (6.83 m). This is the estimated distance from the center of the clay layer to the water table. The travel distance in the former CPC plant area was estimated to be 18 feet (5.49 m), the estimated distance from the base of the source area to the water table. The source area depth was estimated as 3 feet into the sand layer (about 14 feet bgs).

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Seepage Velocity. The vertical seepage velocity or interstitial pore water velocity is an input parameter for SOLUTE and was estimated as follows:

$$V_s = \frac{I}{\theta_w} \quad (3-2)$$

Based on this calculation, the seepage velocity used for the old plant (CPC) landfill was 2.13×10^{-3} ft/d (6.50×10^{-4} m/d). The seepage velocity calculated for the former CPC plant area was 5.49×10^{-3} ft/d (1.67×10^{-3} m/d).

Longitudinal Dispersivity. Longitudinal dispersivities are difficult to measure and are not easily related to the soil type. A typical relationship between longitudinal dispersivity (α_L) and the mean travel distance (transport distance) (Walton, 1988) is:

$$\alpha_L = 0.1 L \quad (3-3)$$

where:

α_L	=	the longitudinal dispersivity (m)
L	=	the travel distance (m)

Therefore, a value of 2.24 ft (0.68 m) was used for the old plant (CPC) landfill, and a value of 1.8 ft or (0.55 m) was used for the former CPC plant area.

Fractional Organic Carbon Content. The fractional organic carbon content f_{oc} of the soil was assumed to be 1.0 percent for the base case, which is the same estimate EPA used for a similar analysis conducted for the Ciba Geigy site to the north (BCM Engineers, 1991).

Alluvial Aquifer Properties

Data required to evaluate near-field mixing in the Alluvial Aquifer consisted of the following:

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- Vertical dispersivity in the Alluvial Aquifer (α_v)
- Horizontal hydraulic conductivity in the Alluvial Aquifer (K)
- Horizontal hydraulic gradient (i)
- Darcy velocity in the Alluvial Aquifer (V)
- Aquifer thickness (B)
- Vertical penetration depth (H)
- Cross-sectional area in direction of groundwater flow (A_1)
- Source surface area (A_2)
- Infiltration rate (I)

The specific values used are shown in Table 3-4 and summarized below:

Vertical Dispersivity. The vertical dispersivity in the Alluvial Aquifer was estimated as one-tenth the longitudinal dispersivity. The longitudinal dispersivity was estimated as one-tenth the travel (transport) distance below the facility, similar to the relationship used to estimate longitudinal dispersivity in the unsaturated zone.

$$\alpha_L = 0.1 L \quad (3-3)$$

$$\alpha_v = 0.1 \alpha_L \quad (3-4)$$

Based on this analysis and assuming a longitudinal travel distance of 400 feet (the length of old plant (CPC) landfill in the groundwater flow direction) the longitudinal dispersivity for the old plant (CPC) landfill area was estimated as 40 feet. The vertical dispersivity was therefore estimated as 4.0 feet (1.2 m).

The longitudinal travel distance in the groundwater flow direction was estimated as 100 feet in the former CPC plant area and the longitudinal and vertical dispersivities were estimated as 10 feet and 1.0 feet (0.305 m), respectively.

Hydraulic Conductivity. Historical data presented in the Draft RI Report (WCC, 1993) were used to estimate the hydraulic conductivity. Available hydraulic conductivity data

include single-well response tests from four wells located in the area, and one pump test from a corrective action well approximately 1,500 feet to the northeast. The single-well response tests were generally reported as minimum values due to the rapid recovery of the wells during testing. The average K value from these four tests was 24.5 ft/day. The K value from the pump test was estimated as 578 ft/day. Since pump tests generally yield more reliable estimates of hydraulic conductivity, the average of 24.5 ft/day and 578 ft/day, which is 300 ft/day (91.4 m/day), was used as the estimate for the hydraulic conductivity.

Hydraulic Gradient. The hydraulic gradients were estimated from the September 1991 potentiometric maps presented in the Draft RI Report (WCC, 1993). These estimates were obtained by calculating the gradient at several locations in both the upper and lower zones of the aquifer. For the old plant (CPC) landfill, the gradient was estimated as 0.0025 to the east, and the gradient in the area to the west of the former CPC plant area was estimated as 0.004 to the west. These gradient calculations are presented in Appendix C.

Darcy Velocity. The Darcy velocity in the aquifer was calculated from the following equation:

$$V = Ki \quad (3-5)$$

where:

$$\begin{aligned} K &= \text{hydraulic conductivity of the Alluvial Aquifer (ft/d)} \\ i &= \text{hydraulic gradient (unitless)} \end{aligned}$$

The Darcy velocity for the old plant (CPC) landfill was estimated as 0.75 ft/day (0.23 m/d), and the Darcy velocity in the former (CPC) plant area was estimated as 1.2 ft/day (0.37 m/d).

Aquifer Thickness. The aquifer thickness, which is used to calculate the vertical penetration depth was estimated as 50 feet (15.2 m). This is based on the difference

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between the elevation of the potentiometric surface (about 10 feet msl) and the elevation of the base of the aquifer (about -40 feet msl).

Horizontal Length of the Source. The horizontal length of the source was estimated as the length of the source in the groundwater flow direction, which is 400 ft (122 m) for the old plant (CPC) landfill and 100 ft (30.5 m) for the former CPC plant area.

Vertical Penetration Depth. The vertical penetration depth was calculated from Equation 2-9. For the old plant (CPC) landfill, the value exceeded the thickness of the aquifer and the penetration depth therefore was assumed to be the aquifer thickness. The vertical penetration depth in the former CPC plant area based on Equation 2-9 is 10 feet (3.05 m).

Cross-Sectional Area. The cross-sectional area in the direction of groundwater flow (A_1) was estimated as the vertical penetration depth times the source width. For the old plant (CPC) landfill, the estimated source width is 300 feet (91.44 m) and therefore A_1 is estimated as $15,000 \text{ ft}^2$ ($1,393 \text{ m}^2$). The source width for the former CPC plant area is estimated as 100 feet and A_1 is estimated as $1,000 \text{ ft}^2$ (92.9 m^2).

Source Surface Area. The source surface area (A_2) is estimated as $120,000 \text{ ft}^2$ ($11,148 \text{ m}^2$) for the old plant (CPC) landfill and $27,500 \text{ ft}^2$ (2555 m^2) for the area west of the former CPC plant.

Infiltration Rate. The estimated infiltration rates are discussed in Section 3.2.

3.3 CHEMICAL DATA

The chemical data used to estimate soil action levels are presented in Table 3-5. The listed values were obtained from several standard references and include Henry's Law Constant, aqueous solubility, organic carbon partition coefficients K_{oc} , and biodegradation in soil.

The K_{oc} for each chemical constituent was estimated as the mean of values listed in Montgomery and Welkom (1990), Jeng et al. (1992) and the EPA Soil Transport and

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Fate Database (EPA, 1991) (excluding the high and low values). Using the mean appropriately eliminates the variation in literature values, which vary because of different conditions of testing by different investigators. The sorption coefficient Kd for mercury was estimated with Equation 2-5 and an estimated pH of 5.0.

A range of half lives was presented in Howard et al. (1991). Some half life values were developed under laboratory conditions favorable to biological degradation. Because conditions in contaminated soils such as found at McIntosh may not be so favorable, it is appropriate as a conservative approach, to apply a "safety factor" to literature half life data. For this analysis, a multiplier of 50 was applied to half lives at the high end of the range from the literature for use as the model input parameter. This is similar to an approach used by Ciba Geigy in developing soil action levels for their site directly north of the Olin McIntosh site (BCM Engineers, 1991). To develop a complete range of potential soil action levels, the analysis was also conducted considering no biodegradation in soil. The range of potential soil action levels developed from both approaches is presented in Section 4.0.

MODELING RESULTS

Potential soil action levels were developed using the methods outlined in Section 2.0 and the conservative input parameters listed in Section 3.0. Several different approaches were used providing a range of potential soil action levels. The results for each approach are presented in this section. Appendix D provides the model input and output. Based on these results, the recommended potential soil action levels for each source area were determined and are presented in Section 5.0.

4.1 OLD PLANT (CPC) LANDFILL)

Table 4-1 summarizes the modeling for the fill/waste and clay (upper source area) in the old plant CPC landfill area. The estimated concentration reduction factor for near-field mixing (CRF_2 , See Section 2.3) was 178.5. The SOLUTE concentration reduction factor for attenuation in the unsaturated zone (CRF_1) was estimated as 2.02 without consideration of decay (i.e., biodegradation). The analyses predicted a target concentration for the leachate (C_{TARGET}) for 1,2-dichlorobenzene, 1,3-dichlorobenzene and mercury higher than the aqueous solubility, indicating that these constituents could not transfer from the soil to the aqueous phase (leachate) at concentrations high enough to cause exceedences of MCLs in groundwater.

When a very conservative biodegradation factor was input to the SOLUTE model, the analyses predicted complete biodegradation of the organic constituents in the unsaturated zone and the CRF_1 could either not be calculated or the resulting C_{TARGET} value was too high to calculate a potential soil action level. The biodegradation rates were estimated based on literature values. Site-specific tests would be required to more accurately predict biodegradation rates.

Table 4-1 also lists the PESTAN model results for the fill/waste and clay in the old plant (CPC) landfill area. The CRF_2 (See Section 2.3) was the same as for the SOLUTE analysis (178.5). Table 4-1 lists the predicted source mass (M_{ALL}) and associated soil action levels that would cause exceedences of the groundwater MCL/MCLGs. For each

constituent, these predicted mass values are more than the calculated mass in the soil based on the RI data (Table 3-1) (i.e., the mass required as input in PESTAN to simulate leachate concentrations that would cause exceedences of the MCL/MCLGs is greater than the mass calculated to be present in the source areas).

As discussed in Section 2.0, the PESTAN model assumes leaching at the aqueous solubility. The literature value used for aqueous solubility of mercury, 0.35 mg/l, (Table 3-5) is lower than the allowable concentration at the top of the aquifer; therefore, potential soil action levels could not be developed using this value. The solubility of mercury varies considerably depending on the ionic form. The analysis was therefore conducted assuming a solubility of twice the literature value (0.70), which is consistent with the allowable leachate concentrations at the top of the Alluvial Aquifer based on the SOLUTE results.

The PESTAN results considering biodegradation are also listed in Table 4-1. These results predict complete biodegradation of 1,2-dichlorobenzene, 1,3-dichlorobenzene and 1,2,4-trichlorobenzene in the unsaturated zone. Potential soil action levels were developed for benzene, chlorobenzene and 1,4, dichlorobenzene.

The unsaturated sand above the Alluvial Aquifer was also considered a source (i.e., lower source interval) for estimating potential soil action levels. The results are summarized in Table 4-2. As a very conservative approach, the concentrations entering the Alluvial Aquifer were calculated as the liquid-phase concentration at the source (i.e., CRF₁ was designated as 1.0) and potential soil action levels were estimated based on the near-field mixing concentration reduction factor (CRF₂) of 178.5. This analysis would be applicable for sands directly above the Alluvial Aquifer; however, with increasing distance above the water table, CRF₁ would increase and approach the value used for the upper source interval (Table 4-1), resulting in higher potential soil action levels than those calculated.

4.2 FORMER CPC PLANT AREA

Potential soil action levels for the former CPC plant area are summarized in Table 4-3. The SOLUTE concentration reduction factor for attenuation in the unsaturated zone

(CRF₁) was estimated as 2.70 without consideration of biodegradation. The near-field mixing concentration reduction factor (CRF₂) was estimated as 55.24. This value is less than the CRF₂ for the old plant (CPC) landfill primarily due to the size of the source. The former CPC plant source surface area is smaller than the old plant (CPC) landfill source surface area. There would be less net infiltration through the former plant area, but the vertical penetration depth would also be less (10 feet as compared to 50 feet). This illustrates one reason why the modeling results are applicable only to area which is modeled.

The analysis was also conducted for a very conservative biodegradation factor as discussed in Section 3.3. The SOLUTE model predicted that benzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene and 1, 2,4-trichlorobenzene would completely degrade in the unsaturated zone and not reach the Alluvial Aquifer. For the other two constituents, the predicted allowable leachate concentrations at the top of the aquifer (C_{TARGET}) are higher than the aqueous solubility and therefore the analyses predict that MCL/MCLGs would not be exceeded.

Table 4-3 also lists the results of the PESTAN model with and without biodegradation. Similar to the old plant (CPC) landfill, the source mass for each constituent that the model predicts would cause exceedence of the MCL/MCLG in the Alluvial Aquifer is greater than the mass calculated from the RI data (Table 3-1).

RECOMMENDED POTENTIAL ACTION LEVELS

Tables 5-1 and 5-2 summarize the potential soil action levels that were developed for the old plant (CPC) landfill and the former CPC plant area, respectively. These tables also provide recommended levels based on the modeling results and site conditions. Potential soil action levels were developed using three models. The Summer's model was used to predict concentration reduction factors due to near-field mixing in the Alluvial Aquifer. Two one-dimensional, publicly available contaminant transport models (SOLUTE and PESTAN) were used to estimate concentration reduction factors for migration through the unsaturated zone. Using both SOLUTE and PESTAN provided insight on the validity of the analyses. The SOLUTE and PESTAN models were applied with and without biodegradation.

The Summer's model results produced soil action levels that were lower than the other two models because the Summer's model does not account for any attenuation in the unsaturated zone. The soil action levels from the Summer's model are only applicable for the sands directly above the water table in the old plant CPC landfill. PESTAN (without biodegradation) typically produced soil action values that were lower than SOLUTE because of PESTAN's assumption of instantaneous equilibrium (see paragraph below). The range of values from the PESTAN and SOLUTE models were used to develop soil action levels in the fill/waste and clay material in the old plant (CPC) landfill and the clay/upper sand in the former CPC plant area.

The potential action levels from the PESTAN model (without biodegradation) are considered to be biased low due to the assumptions used in the model relative to actual site conditions. The PESTAN model assumes that the source area leaches at the chemical-specific aqueous solubility and that equilibrium between the soil and water is reached instantaneously as rainfall percolates through the soil column. The SOLUTE model uses a more technically rigorous approach by calculating leachate concentrations at the source from the sorption coefficient, which is based on chemical-specific factors and soil properties and is considered to more accurately simulate site conditions.

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Biodegradation is an important attenuation mechanism and should be considered for development of soil action levels, particularly for constituents such as benzene and chlorobenzene with relatively short half lives. The biodegradation rate is dependent on the physical and chemical conditions of the soil and the contaminant concentrations, and therefore would vary both spatially and temporally. Site-specific biodegradation data were not available, so the selected degradation rates used in the models were from the literature. The literature values were commonly developed from experiments that were conducted under controlled conditions that may be more favorable to biodegradation than conditions at the site. The approach for the modelling was to use conservative biodegradation rates based on these literature values and apply a safety factor of 50.

When these degradation rates were input in the SOLUTE model, the model predicted complete or near complete degradation of the organic constituents in the unsaturated zone. The site groundwater data indicate that this has been the case in the past, particularly for the more common constituents detected more frequently in the groundwater such as chlorobenzene and 1,4-dichlorobenzene. The results from the PESTAN model with biodegradation did allow calculation of potential soil action levels for most of the constituents.

As stated above, the potential soil action levels produced by the PESTAN model (without biodegradation) were considered biased low due to the method in which the leachate concentration is estimated. Further, the SOLUTE results with biodegradation are not considered appropriate considering the site conditions. Therefore, the recommended soil action values were selected between the values from SOLUTE, without biodegradation, and those from PESTAN with biodegradation. In some cases, the specific values selected within this range were determined based on comparing the mass in the source areas to the allowable mass based on the PESTAN model (without biodegradation). Comparison of these mass calculations provide an indication of the safety factor for each model result without considering biodegradation. The larger the safety factor, the more weight was placed on the results from PESTAN with biodegradation in selecting the recommended soil action level values. For example, the recommended soil action levels are close to the SOLUTE results (i.e., are on the low end of the range and only minimal biodegradation is considered) for constituents for which calculations of actual mass values present were close to those that the PESTAN

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model predicted would be required to cause exceedences of MCLs/MCLGs. This specific reasoning for each recommended potential soil action level is noted in Tables 5-1 and 5-2.

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TABLES

TABLE 1-1

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TCL AND SELECTED TAL CONSTITUENT RESULTS FOR
OLD PLANT (CPC) LANDFILL AREAOU-1 PHASE III SAMPLING^{1,2}
FILL/WASTE MATERIAL

Parameter	BOP1 (mg/kg)	BOP2 (mg/kg)	BOP3 (mg/kg)	BOP4 (mg/kg)
TCL VOLATILE ORGANICS				
Chlorobenzene	6.3	0.004J	0.057	9.7
Chloroform	--	0.009J	--	--
TCL SEMIVOLATILE ORGANICS				
1,2,4,5-Tetrachlorobenzene	0.26J	0.15J	16	32
1,2,4-Trichlorobenzene	0.75	--	20	6.4
1,2-Dichlorobenzene	2.9	--	110	2.1J
1,3-Dichlorobenzene	0.16J	--	6.6	1.9J
1,4-Dichlorobenzene	2.7	--	120	17
Fluoranthene	--	--	--	0.42J
Hexachlorobenzene	19	13	110	170
Naphthalene	--	--	--	2.6J
Phenanthrene	--	--	--	0.41J
Pyrene	--	--	--	0.44J
TCL PESTICIDE/PCB ORGANICS				
4,4'-DDE	--	0.034J	0.1	0.023J
4,4'-DDT	--	0.025J	--	--
Alpha-BHC	0.022J	0.86JX	0.089JX	--
Aroclor - 1260	--	--	--	0.94N
Beta-BHC	--	0.23	0.051J	--
Delta-BHC	--	--	0.025J	--
Endosulfan I	--	--	0.026J	--
Endosulfan II	--	0.0055J	--	--
Endosulfan Sulfate	--	--	0.031J	--
Gamma-BHC	--	0.12	--	--
Gamma-Chlordane	--	--	--	0.012
Heptachlor	--	--	0.023J	--
TAL INORGANICS				
Arsenic	2.9	0.85R	0.85R	0.96R
Chromium	31.6	--	19.9J	31.4J
Copper	8.3	--	19.8	77.1
Lead	8.3J	3.46J	6.3J	7.2J
Mercury	--	57.1	21.7	406
Nickel	7.9	--	--	--
Zinc	40.3J	--	69.6J	168J

NOTES:

- ¹ Only compounds detected are listed.
² Samples collected August 15 to August 20, 1992.
 J The associated numerical value was an estimated quantity.
 R The presence or absence of the analyte could not be verified from the existing data.
 X Observed as semivolatile TIC.
 N There was presumptive evidence to make a tentative identification.
 -- Compound not reported in this sample.

TABLE 1-2
SUMMARY OF TCL AND SELECTED TAL CONSTITUENT
RESULTS FOR OLD PLANT (CPC) LANDFILL AREA
OU-1 PHASE III SAMPLING¹
CLAY AND SAND SAMPLES

Parameter	Base of Clay		Upper Sand ²		Lower Sand ³		Loose Silt/Clay Sample at BOP1
	Concentration Range of Detections ⁴ (mg/kg)	Average Concentration (mg/kg)	Concentration Range of Detections ⁴ (mg/kg)	Average Concentration (mg/kg)	Concentration Range of Detections ⁴ (mg/kg)	Average Concentration (mg/kg)	Concentration (mg/kg)
TCL VOLATILE ORGANICS							
1,1,1-Trichloroethane	--	-	0.53J	0.265	--	0	--
Acetone	0.38J-0.41J	0.158	--	0	--	0	--
Benzene	0.009J-3.3	0.672	--	0	2.3	0.329	2.4
Chlorobenzene	0.007J-7.3	1.851	46	23	0.001J-36	9.715	60
Chloroform	0.004J-0.16	0.044	--	0	0.004J-0.033	0.01	0.37J
Tetrachloroethene	--	0	--	0	--	0	0.20J
TCL SEMIVOLATILE ORGANICS							
1,2,4,5-Tetrachlorobenzene	0.22J	0.044	0.8J	0.4	0.67-4.1	0.681	30
1,2,4-Trichlorobenzene	0.71J	0.142	1.6J	0.8	0.79-4.6	0.770	30
1,2-Dichlorobenzene	1.8-57	11.76	130	65	6.4-7.5	1.986	120
1,3-Dichlorobenzene	5.0	1	11	5.5	0.15J-0.28J	0.061	7.1
1,4-Dichlorobenzene	2.2-74	15.24	150	75	8.5-15	3.357	120
2-Chlorophenol	0.44J	0.088	--	0	--	0	--
Hexachlorobenzene	0.40J	0.08	0.88J	0.44	0.24J-1.2	0.206	140
Phenol	2.9-3.7	1.32	5.2	2.6	11	1.571	3.1J

TABLE 1-2 (Continued)
SUMMARY OF TCL AND SELECTED TAL CONSTITUENT
RESULTS FOR OLD PLANT (CPC) LANDFILL AREA
OU-1 PHASE III SAMPLING¹
CLAY AND SAND SAMPLES

Parameter	Base of Clay		Upper Sand ²		Lower Sand ³		Loose Silt/Clay Sample at BOP1
	Concentration Range of Detections ⁴ (mg/kg)	Average Concentration (mg/kg)	Concentration Range of Detections ⁴ (mg/kg)	Average Concentration (mg/kg)	Concentration Range of Detections ⁴ (mg/kg)	Average Concentration (mg/kg)	Concentration (mg/kg)
TCL PESTICIDE/PCB ORGANICS							
4,4'-DDD	--	0	--	0	--	0	0.54J
4,4'-DDE	--	0	0.005J	0.003	0.0150J-0.059J	0.011	--
4,4'-DDT	0.006J	0.001	0	0	--	0	0.07
Alpha-BHC	0.022-0.52J	0.113	0.0023J-0.66J	0.331	0.01J-0.27	0.05	0.68X
Alpha-Chlordane	--	0	0.0026J	0.001	--	0	--
Beta-BHC	0.007J-0.083J	0.018	0.1J	0.050	0.004	0.001	--
Delta-BHC	0.075J	0.015	0.093J	0.047	0.006-0.023	0.004	--
Dieldrin	0.006J	0.001	--	0	0.006	0.001	--
Endosulfan II	--	0	--	0	--	0	0.054J
Gamma-BHC	0.009J-0.11J	0.026	0.14J	0.070	0.002	0.0003	--
Heptachlor	0.002J	0.0004	--	0	--	0	--
Methoxychlor	--	0	--	0	0.04	0.006	--

TABLE 1-2 (Continued)

**SUMMARY OF TCL AND SELECTED TAL CONSTITUENT
RESULTS FOR OLD PLANT (CPC) LANDFILL AREA**

**OU-1 PHASE III SAMPLING¹
CLAY AND SAND SAMPLES**

Parameter	Base of Clay		Upper Sand ²		Lower Sand ³		Loose Silt/Clay Sample at BOP1
	Concentration Range of Detections ⁴ (mg/kg)	Average Concentration (mg/kg)	Concentration Range of Detections ⁴ (mg/kg)	Average Concentration (mg/kg)	Concentration Range of Detections ⁴ (mg/kg)	Average Concentration (mg/kg)	Concentration (mg/kg)
TAL INORGANICS							
Arsenic	0.93R-4.7R	2.116	0.76R-1.5J	1.13	0.860-4.9R	1.211	0.99R
Chromium	15.9J-34J	23.84	2.6J-29.5J	16.05	4.1J-4.9J	1.286	13.1J
Copper	5.7-13.1	8.02	8.1	4.05	--	0	--
Cyanide	4.2	0.84	--	0	--	0	--
Lead	8.3J-54.3J	16.18	3.8J	1.9	--	0	1.6J
Mercury	0.62	0.124	--	0	--	0	0.42
Thallium	--	0	--	0	0.4J	0.057	--
Zinc	20.1J-35.6J	26.5	125J	62.5	9.5J	1.357	51.7J

NOTES:

¹ Only compounds that were detected are listed.

² Upper sand is from 23 to 30 feet.

CH

³ Lower sand is 30 feet and below.

CH

⁴ Nondetections not included in concentration range.

J Estimated concentration below the quantitation limit.

CH

R The presence or absence of the analyte could not be verified from the existing data.

CH

X Observed as a semivolatile TIC.

CH

-- Not detected.

CH

CH

CH

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06-05-86

TABLE 1-3
TCL AND SELECTED TAL CONSTITUENT RESULTS FOR
FORMER CPC PLANT AREA
OU-1 PHASE III SAMPLING^{1,2,3}
(Concentrations in mg/kg)

Parameter	BCP1 Clay 2-4 ft	BCP1 Clay 8-10 ft	BCP1 Sand 12-14 ft	BCP1 Sand 30-32 ft	BCP1 Dup ⁴ Sand 30-32 ft	BCP2 Clay 2-4 ft	BCP2 Clay 8-10 ft	BCP2 Sand 14-16 ft
TCL VOLATILE ORGANICS								
Benzene	0.003J	--	--	--	--	--	--	--
Carbon Disulfide	--	0.019	--	--	--	--	--	--
Chlorobenzene	0.54	0.086	0.4	--	--	--	--	--
Chloroform	--	0.007J	0.005J	--	--	0.002J	0.008J	--
Tetrachloroethene	--	--	0.001J	--	--	--	--	--
TCL SEMIVOLATILE ORGANICS								
1,2,4,5-Tetrachlorobenzene	0.74	750	9.9	0.055J	0.055J	--	--	--
1,2,4-Trichlorobenzene	1.3	700	8.5	--	--	--	--	--
1,2-Dichlorobenzene	--	30	3.5	--	--	--	--	--
1,3-Dichlorobenzene	--	2.5J	0.22J	--	--	--	--	--
1,4-Dichlorobenzene	--	24	2.2	--	--	--	--	--
Hexachlorobenzene	0.2J	75	8	1.5	0.3J	0.13J	--	--

TABLE 1-3 (Continued)
TCL AND SELECTED TAL CONSTITUENT RESULTS FOR
FORMER CPC PLANT AREA
OU-1 PHASE III SAMPLING^{1,2,3}
(Concentrations in mg/kg)

Parameter	BCP1 Clay 2-4 ft	BCP1 Clay 8-10 ft	BCP1 Sand 12-14 ft	BCP1 Sand 30-32 ft	BCP1 Dup ⁴ Sand 30-32 ft	BCP2 Clay 2-4 ft	BCP2 Clay 8-10 ft	BCP2 Sand 14-16 ft
TCL PESTICIDE/PCB ORGANICS								
4,4'-DDD	--	0.017J	--	--	--	--	--	--
4,4'-DDT	--	0.051J	--	--	--	--	--	--
Alpha-BHC	0.017J	0.12	0.031J	--	--	--	--	--
Beta-BHC	--	0.016J	--	--	--	--	--	--
Delta-BHC	--	--	0.0056J	--	--	--	--	--
Endosulfan I	--	0.0028J	--	--	--	--	--	--
Gamma-BHC	--	--	0.0031J	--	--	--	--	--
INORGANICS								
Arsenic	3.5	2.72	--	--	--	1.7J	--	1 J
Chromium	45.6	23.4	--	--	--	33.1	8.9	8.5
Copper	10.5	9.7	--	--	--	5.2	--	--
Lead	13.8J	9.7J	3.4J	--	--	9.5J	12.5J	7.8J
Selenium	--	--	--	--	0.75J	--	--	--
Zinc	24.3J	19.3J	--	--	--	22.7J	17.4J	45.6J

TABLE 1-3 (Continued)

TCL AND SELECTED TAL CONSTITUENT RESULTS FOR
FORMER CPC PLANT AREA
OU-1 PHASE III SAMPLING^{1,2,3}
(Concentrations in mg/kg)

NOTES:

- ¹ Samples collected from August 11, 1992 to August 14, 1992.
- ² Only compounds detected are listed. No compounds were detected in BCP2 in the sand sample from 18 to 20 feet.
- ³ All depths from ground surface.
- ⁴ Duplicate sample of BCP1.
- J The associated numerical value was an estimated quantity.
- Compound not detected in this sample.

TABLE 1-4

3 8 1547

**GROUNDWATER CHEMICALS OF POTENTIAL
CONCERN DEVELOPED FOR BASELINE
RISK ASSESSMENT¹**

VOLATILES	
Benzene	
Bromodichloromethane	
Chlorobenzene	
Chloroform	
SEMIVOLATILES	
1,2,4-Trichlorobenzene	
1,2-Dichlorobenzene	
1,3-Dichlorobenzene	
1,4-Dichlorobenzene	
Pentachloronitrobenzene	
Pentachlorobenzene	
PESTICIDES	
Alpha-BHC	
INORGANICS	
Antimony	
Arsenic	
Beryllium	
Cadmium	
Chromium	
Copper	
Lead	
Mercury	

NOTES:

- 1,3-Dichlorobenzene was not on the list of chemicals of concern for the baseline risk assessment, but is listed here because of its close association with the other dichlorobenzene isomers.

TABLE 3-1
ESTIMATED MASS OF CONSTITUENTS IN SOIL¹
(Mass in kg)

Constituents	Old Plant (CPC) Landfill			Former CPC Plant Area	
	Residual Waste/Fill	Clay and Loose Saturated Silt/Clay	Sand	Clay	Sand
Benzene	0	58.4	22.0	0.01	0
Chlorobenzene	208	824	1,331	2.71	1.60
1,2-Dichlorobenzene	1,258	2,398	2,058	130	14
1,3-Dichlorobenzene	94.4	167	167	10.8	0.88
1,4-Dichlorobenzene	1,524	2,678	2,446	10.4	8.80
1,2,4-Trichlorobenzene	297.4	376	75.2	3,034	34.0
Mercury	5,701	8.04	0	--	--

NOTES:

¹ Assumes bulk density of sand, $\rho_b = 1,720 \text{ kg/m}^3$, and $\rho_b = 1,590 \text{ kg/m}^3$ for all other units.

TABLE 3-2
SUMMARY OF SOURCE INPUT DATA

OLD PLANT (CPC) LANDFILL (Fill Waste and Clay Material)					
SOLUTE Model			PESTAN Model		
Parameter	Units		Parameter	Units	All Cases
Source Concentration (C_o)	mg/l	1.0	Area (A)	ft ² (m ²)	120,000 (11,148)
			Thickness (d)	(ft) (m)	23 (7)
			Bulk Density (ρ_b)	lbs/ft ³ (kg/m ³)	99.2 (1,590)
			Source Concentration (C_o)	mg/kg	See Note 1

FORMER CPC PLANT AREA					
SOLUTE Model			PESTAN Model		
Parameter	Units		Parameter	Units	All Cases
Source Concentration (C_o)	mg/l	1.0	Area (A)	ft ² (m ²)	27,500 (2,555)
			Thickness (d)	ft (m)	10 (3.05)
			Bulk Density (ρ_b)	lbs/ft ³ (kg/m ³)	99.2 (1,590)
			Source Concentration (C_o)	mg/kg	See Note 1

NOTES: ¹ Input source concentration varied for each chemical constituent.

TABLE 3-3
SUMMARY OF UNSATURATED ZONE INPUT DATA

Parameter	Symbol	Units	Old Plant (CPC) Landfill	Former CPC Plant Area	Comments
Infiltration Rate	I	ft/d (m/d)	5.25×10^{-4} (1.60×10^{-4})	7.31×10^{-4} (2.22×10^{-4})	HELP Model (WCC, 1993b)
Saturated Hydraulic Conductivity	K _{Sat}	ft/day (m/d)	0.28 (0.0864)	30 (9.14)	Literature values representative of silt for old plant (CPC) landfill (Freeze and Cherry, 1979) -- one-tenth of horizontal K for former CPC plant area.
Saturated Water Content	θ	Dimensionless	0.40	0.35	Literature values representative of silt for old plant (CPC) landfill and sand for former CPC plant area (Driscoll, 1986)
Characteristic Curve Coefficient	b	Dimensionless	5.0	4.0	Literature values representative of silt for old plant (CPC) landfill and sand for former CPC plant area (CSMS, 1992)
Volumetric Water Content	θ _w	Dimensionless	0.246	0.133	Calculated by PESTAN Model using empirical relationship from Clapp and Hornberger (1978)
Bulk Density	ρ _b	lbs/ft ³ (Kg/m ³)	99.2 (1,590)	107.5 (1,720)	Calculated from volumetric water content (Equation 3-1)
Transport Distance	L	ft (m)	22.4 (6.83)	18 (5.5)	Old plant (CPC) landfill—Distance from center of clay layer to water table Former CPC plant area—Distance from source depth to water table
Seepage Velocity	V _s	ft/d (m/d)	2.13×10^{-3} (6.50×10^{-4})	5.49×10^{-3} (1.67×10^{-3})	Calculated from I/θ _w

TABLE 3-3 (Continued)
SUMMARY OF UNSATURATED ZONE INPUT DATA

Parameter	Symbol	Units	Old Plant (CPC) Landfill	Former CPC Plant Area	Comments
Longitudinal Dispersivity	α_L	ft (m)	2.2 (0.68)	1.8 (0.55)	Estimated as $0.1 \times L$
Fractional Organic Carbon	f_{oc}	%	1.0	1.0	Estimated-Same value as used by EPA for similar analysis at Ciba Geigy site to the north (BCM Engineers, 1991)

TABLE 3-4
DATA USED TO CALCULATE CRF₂

Parameter	Symbol	Units	Old Plant (CPC) Landfill	Former CPC Plant Area	Comments
Vertical Dispersivity	α_v	ft (m)	4.0 (1.2)	1.0 (0.305)	Estimated as 1/100 of longitudinal transport distance
Hydraulic Conductivity	K	ft/day (m/day)	300 (91.4)	300 (91.4)	Single-Well response tests and pump test data
Gradient	i	Dimensionless	0.0025	0.004	September 1991 potentiometric map (See Appendix C)
Darcy Velocity	V	ft/day (m/day)	0.75 (0.23)	1.2 (0.37)	$V = Ki$
Aquifer Thickness	B	ft (m)	50 (15.2)	50 (15.2)	Site stratigraphic and potentiometric data
Horizontal Length of the Source	L _b	ft (cm)	400 (122)	100 (30.5)	Length of the source area in the groundwater flow direction
Vertical Penetration Depth	H	ft (m)	50 (15.2)	10 (3.05)	Equation 2-9
Cross-Sectional Area of Groundwater Flow	A ₁	ft ² (m ²)	15,000 (1,393)	1,000 (92.9)	H x width of source
Source Surface Area	A ₂	ft ²	120,000 (11,148)	27,500 (2,555)	Draft FS Report (WCC, 1993a)
Infiltration Rate	I	in/yr (cm/yr)	5.25×10^{-4} (1.60×10^{-4})	7.31×10^{-4} (2.22×10^{-4})	HELP Model (WCC, 1993b)

TABLE 3-5
SUMMARY OF CHEMICAL INPUT DATA

Soil Action Constituent	Henry's Law Constant (atm m ³ /mole)	Aqueous Solubility (mg/l)	K _d ⁷	Biodegradation in Soil		
				Biodegradation Literature Values ⁵ (Half-lives in days)	Biodegradation Safety Factor	Biodegradation Input Value (days)
VOLATILES						
Benzene	0.00543 ²	1,791 ²	70.3	5-16	50	800
Chlorobenzene	0.00345 ¹	471.7 ¹ (at 25 °C)	188	68-150	50	7,500
SEMOVATILES						
1,2,4-Trichlorobenzene	0.00142 ¹	48.8 ¹ (at 20 °C)	4,869	28-180	50	9,000
1,2-Dichlorobenzene	0.0012 ¹	156 ¹ (at 25 °C)	861	28-180	50	9,000
1,3-Dichlorobenzene	0.0018 ¹	111 ¹ (at 20 °C)	646	28-180	50	9,000
1,4-Dichlorobenzene	0.0015 ¹	87 ¹	431	28-180	50	9,000
INORGANIC						
Mercury	0.0003553 ⁶	0.350 ⁴	NA ⁸	NA	--	--

REFERENCES:

- ¹ Handbook of Environmental Fate and Exposure Data For Organic Chemicals, Volume I, Philip H. Howard, Lewis Publishers, Chelsea, Michigan, 1989.
- ² Handbook of Environmental Fate and Exposure Data For Organic Chemicals, Volume II, Philip H. Howard, Lewis Publishers, Chelsea, Michigan, 1990.
- ³ Groundwater Chemicals Desk Reference, John H. Montgomery and Linda M. Welkom, Lewis Publishers, Chelsea, Michigan, 1990.
- ⁴ U.S. EPA. 1991. Soil Transport and Fate Database 2.0 and Model Management System. Robert S. Kerr Environmental Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, ADA, OK. June.
- ⁵ Values from Handbook of Environmental Degradation Rates, Philip H. Howard et al., Lewis Publishers, Inc., Chelsea, Michigan, 1991.
- ⁶ Metallic mercury, Strom, et al., 1981.
- ⁷ Estimated as the mean of values listed in Montgomery and Welkom (1990), Jeng et. al., (1992) and the EPA Soil Transport and Fate Database (EPA, 1991) (excluding the high and low values).
- ⁸ For mercury, the sorption coefficient (K_d) was estimated using the following relationship between K_d and pH provided in Loux, et al., (1990):

$$\log K_d = 0.122 \times pH + 1.42$$

For an estimated pH of 5.0 K_d = 107

NA Not Applicable

TABLE 4-1
POTENTIAL SOIL ACTION LEVELS
OLD PLANT (CPC) LANDFILL AREA
FILL/WASTE AND CLAY

SOLUTE MODEL WITHOUT BIODEGRADATION						
Constituent	CRF ₁	CRF	MCL/MCLG (mg/l)	C _{TARGET} (mg/l)	A _d	C _{SAL} (mg/Kg)
Benzene	2.02	178.5	0.005	1.8	0.8	1.4
Chlorobenzene	2.02	178.5	0.100	36.1	1.8	65
1,2-Dichlorobenzene	2.02	178.5	0.600	216.4 ¹	7.6	1,644
1,3-Dichlorobenzene	2.02	178.5	0.600	216.4 ¹	5.7	1,233
1,4-Dichlorobenzene	2.02	178.5	0.075	27.0	3.9	105
1,2,4-Trichlorobenzene	2.02	178.5	0.070	25.2	42.3	1,066
Mercury	2.02	178.5	0.002	0.7 ¹	92.9	65

SOLUTE MODEL WITH BIODEGRADATION							
Constituent	CRF ₁	CRF ₂	MCL/MCLG (mg/l)	C _{TARGET} (mg/l)	A _d	Biodegradation Input Factor (Half-life x 50) (days)	C _{SAL} (mg/Kg)
Benzene	⁻²	178.5	0.005	⁻²	0.8	800	⁻²
Chlorobenzene	5,000	178.5	0.100	892,500 ²	1.8	7,500	⁻³
1,2-Dichlorobenzene	⁻²	178.5	0.600	⁻²	7.6	9,000	⁻²
1,3-Dichlorobenzene	⁻²	178.5	0.600	⁻²	5.7	9,000	⁻²
1,4-Dichlorobenzene	⁻²	178.5	0.075	⁻²	3.9	9,000	⁻²
1,2,4-Trichlorobenzene	⁻²	178.5	0.070	⁻²	42.3	9,000	⁻²
Mercury	2.02	178.5	0.002	0.7 ¹	92.9	NA	65

TABLE 4-1 (Continued)

**POTENTIAL SOIL ACTION LEVELS
OLD PLANT (CPC) LANDFILL AREA
FILL/WASTE AND CLAY**

PESTAN MODEL WITHOUT BIODEGRADATION						
Constituent	CRF₂	MCL/MCLG (mg/l)	C₁ (mg/l)	M_{AB} (Kg)	A_d	C_{SAL} (mg/Kg)
Benzene	178.5	0.005	0.89	104	0.8	0.83
Chlorobenzene	178.5	0.100	17.85	4,905	1.8	39
1,2-Dichlorobenzene	178.5	0.600	107.1	182,832	7.6	1,472
1,3-Dichlorobenzene	178.5	0.600	107.1	261,984	5.7	2,109
1,4-Dichlorobenzene	178.5	0.075	13.39	8,361	3.9	67
1,2,4-Trichlorobenzene	178.5	0.070	12.50	89,186	42.3	718
Mercury	178.5	0.002	0.36	6,466	92.9	52

PESTAN MODEL WITH BIODEGRADATION							
Constituent	CRF₂	MCL/MCLG (mg/l)	C₁ (mg/l)	M_{AB} (Kg)	A_d	Biodegradation Input Factor (Half-life x 50) (days)	C_{SAL} (mg/Kg)
Benzene	178.5	0.005	0.89	5,797	0.8	800	467
Chlorobenzene	178.5	0.100	17.85	10,367	1.8	7,500	83
1,2-Dichlorobenzene	178.5	0.600	107.1	- ²	7.6	9,000	- ²
1,3-Dichlorobenzene	178.5	0.600	107.1	- ²	5.7	9,000	- ²
1,4-Dichlorobenzene	178.5	0.075	13.39	22,297	3.9	9,000	179
1,2,4-Trichlorobenzene	178.5	0.070	12.50	- ²	42.3	9,000	- ²
Mercury	178.5	0.002	0.36	6,468	92.9	NA	52

NOTES: ¹ C_{TARGET} is higher than chemical-specific aqueous solubility.

² Model indicates complete biodegradation before contaminant reaches the Alluvial Aquifer.

³ C_{TARGET} is too high to calculate concentration.

TABLE 4-2
POTENTIAL SOIL ACTION LEVELS
OLD PLANT (CPC) LANDFILL AREA
UNSATURATED SAND

SUMMER'S MODEL						
Constituent	CRF ₁ ¹	CRF ₂	MCL/MCLG (mg/l)	C _{TARGET} (mg/l)	A _d	C _{SAL} (mg/Kg)
Benzene	1.00	178.5	0.005	0.89	0.8	0.71
Chlorobenzene	1.00	178.5	0.100	17.85	1.8	32
1,2-Dichlorobenzene	1.00	178.5	0.600	107.1	7.6	814
1,3-Dichlorobenzene	1.00	178.5	0.600	107.1	5.7	610
1,4-Dichlorobenzene	1.00	178.5	0.075	13.39	3.9	52
1,2,4-Trichlorobenzene	1.00	178.5	0.070	12.50	42.3	528
Mercury	1.00	178.5	0.002	0.36	92.9	33

NOTES:

¹ Analysis does not consider attenuation in the unsaturated zone and would only be applicable for sands directly above the water table.

3 8 1556

Woodward-Clyde

TABLE 4-3
POTENTIAL SOIL ACTION LEVELS
FORMER CPC PLANT AREA

SOLUTE MODEL WITHOUT BIODEGRADATION						
Constituent	CRF ₁	CRF ₂	MCL/MCLG (mg/l)	C _{TARGET} (mg/l)	A _d	C _{SAL} (mg/Kg)
Benzene	2.74	55.24	0.005	0.8	0.8	0.64
Chlorobenzene	2.74	55.24	0.100	15.1	1.8	27
1,2-Dichlorobenzene	2.74	55.24	0.600	90.8	8.1	735
1,3-Dichlorobenzene	2.74	55.24	0.600	90.8	6.1	554
1,4-Dichlorobenzene	2.74	55.24	0.075	11.4	4.1	47
1,2,4-Trichlorobenzene	2.74	55.24	0.070	10.6	45.3	480

SOLUTE MODEL WITH BIODEGRADATION							
Constituent	CRF ₁	CRF ₂	MCL/MCLG (mg/l)	C _{TARGET} (mg/l)	A _d	Biodegradation Input Factor (Half-life x 50) (days)	C _{SAL} (mg/Kg)
Benzene	¹	55.24	0.005	¹	0.8	800	¹
Chlorobenzene	435	55.24	0.100	2,403 ²	1.8	7500	4,324
1,2-Dichlorobenzene	¹	55.24	0.600	¹	8.1	9000	¹
1,3-Dichlorobenzene	¹	55.24	0.600	¹	6.1	9000	¹
1,4-Dichlorobenzene	10,000	55.24	0.075	552,400 ²	4.1	9000	1.69 x 10 ⁵
1,2,4-Trichlorobenzene	¹	55.24	0.070	¹	45.3	9000	¹

NOTES: ¹ Model indicates complete biodegradation before contaminant reaches the Alluvial Aquifer.

² C_{TARGET} is higher than chemical-specific aqueous solubility.

TABLE 4-3 (Continued)

**POTENTIAL SOIL ACTION LEVELS
FORMER CPC PLANT AREA**

PESTAN MODEL WITHOUT BIODEGRADATION						
Constituent	CRF ₂	MCL/MCLG (mg/l)	C ₁ (mg/l)	M _{AB} (Kg)	A _d	C _{SAL} (mg/Kg)
Benzene	55.24	0.005	0.28	6	0.8	0.5
Chlorobenzene	55.24	0.100	5.52	294	1.8	24
1,2-Dichlorobenzene	55.24	0.600	33.14	8,227	8.1	666
1,3-Dichlorobenzene	55.24	0.600	33.14	6,439	6.1	522
1,4-Dichlorobenzene	55.24	0.075	4.15	498	4.1	40
1,2,4-Trichlorobenzene	55.24	0.070	3.87	5,136	45.3	416

PESTAN MODEL WITH BIODEGRADATION							
Constituent	CRF ₂	MCL/MCLG (mg/l)	C ₁ (mg/l)	M _{AB} (Kg)	A _d	Biodegradation Input Factor (Half-life x 50) (days)	C _{SAL} (mg/Kg)
Benzene	55.24	0.005	0.28	49	0.8	800	3.9
Chlorobenzene	55.24	0.100	5.52	383	1.8	7,500	31
1,2-Dichlorobenzene	55.24	0.600	33.14	11,038	8.1	9,000	894
1,3-Dichlorobenzene	55.24	0.600	33.14	9,045	6.1	9,000	733
1,4-Dichlorobenzene	55.24	0.075	4.15	639	4.1	9,000	52
1,2,4-Trichlorobenzene	55.24	0.070	3.87	6,643	45.3	9,000	538

TABLE 5-1
SUMMARY OF POTENTIAL SOIL ACTION LEVELS
OLD PLANT (CPC) LANDFILL

FILL/WASTE AND CLAY					
Constituent	SOLUTE without Biodegradation (mg/kg)	SOLUTE with Biodegradation (mg/kg)	PESTAN without Biodegradation (mg/kg)	PESTAN with Biodegradation (mg/kg)	Recommended Soil Action Level (mg/kg)
Benzene	1.4	²	0.83	467	5.0 ⁴
Chlorobenzene	65	³	39	83	79 ⁵
1,2-Dichlorobenzene	1,644 ¹	²	1,472	²	1,645 ⁶
1,3-Dichlorobenzene	1,233 ¹	²	2,109	²	1,670 ⁷
1,4-Dichlorobenzene	105	²	67	179	140 ⁵
1,2,4-Trichlorobenzene	1,066	²	718	²	1,000 ⁶
Mercury	65 ¹	65	52	52	55 ⁸

UNSATURATED SAND			
Constituent	Summer's Model (mg/kg)	Recommended Soil Action Levels Lower Portion of Sand (mg/kg)	Recommended Soil Action Levels Upper Portion of Sand
Benzene	0.71	5.0 ⁹	5.0 ⁹
Chlorobenzene	32	30 ¹⁰	55 ¹¹
1,2-Dichlorobenzene	814	800 ¹⁰	1,200 ¹¹
1,3-Dichlorobenzene	610	600 ¹⁰	1,130 ¹¹
1,4-Dichlorobenzene	52	50 ¹⁰	95 ¹¹
1,2,4-Trichlorobenzene	528	520 ¹⁰	750 ¹¹
Mercury	33	30 ¹⁰	42 ¹¹

TABLE 5-1 (Continued)

SUMMARY OF POTENTIAL SOIL ACTION LEVELS
OLD PLANT (CPC) LANDFILL

- NOTES:
- ¹ C_{TARGET} is higher than chemical-specific aqueous solubility.
 - ² Model indicates complete biodegradation before contaminant reaches the Alluvial Aquifer.
 - ³ C_{TARGET} is too high to calculate concentration.
 - ⁴ The relationship provided in Note 5 results in a benzene soil action value of 206 mg/kg. Considering that the SOLUTE result was 1.4 mg/kg, a value closer to SOLUTE was considered more appropriate.
 - ⁵ Recommended value is approximately equal to the following:

$$\text{PESTAN Value With Biodegradation} - \text{SOLUTE Value Without Biodegradation} \times \left(\frac{\text{Calculated Mass Table 3-1}}{\text{M_{eff} Table 4-1}} \right)$$

- ⁶ Approximately equal to SOLUTE without biodegradation.
- ⁷ Approximate average of PESTAN without biodegradation and SOLUTE without biodegradation.
- ⁸ Approximate average of PESTAN and SOLUTE values.
- ⁹ Selected as reasonable value above the Summer's model result. The benzene action level from the Summer's model was unreasonably low considering the high solubility, low half-life and the mass of benzene in the sand.
- ¹⁰ Based on the Summer's model result rounded down to the nearest 10 mg/kg.
- ¹¹ Approximate average of the recommended values in the fill/waste and the clay and the recommended values in the sand.

TABLE 5-2
SUMMARY OF POTENTIAL SOIL ACTION LEVELS
FORMER CPC PLANT AREA

Constituent	SOLUTE without Biodegradation (mg/kg)	SOLUTE with Biodegradation (mg/kg)	PESTAN without Biodegradation (mg/kg)	PESTAN with Biodegradation (mg/kg)	Recommended Soil Action Level (mg/kg)
Benzene	0.64	¹	0.5	3.9	3.9 ²
Chlorobenzene	27	4,324	24	31	30 ²
1,2-Dichlorobenzene	735	¹	666	894	890 ²
1,3-Dichlorobenzene	554	¹	522	733	730 ²
1,4-Dichlorobenzene	47	1.65×10^5	40	52	50 ²
1,2,4-Trichlorobenzene	480	¹	416	538	500 ²

NOTES:

¹ Model indicates complete biodegradation in the unsaturated zone.

²
$$\text{PESTAN Value With Biodegradation} = \text{SOLUTE Value Without Biodegradation} \times \left(\frac{\text{Calculated Mass Table 3-1}}{\text{Mass Table 4-3}} \right)$$

Values are sometimes rounded down to the nearest 10 mg/kg.

Woodward-Clyde

3 8 1561

FIGURES

165



OWN ALSO
OWNS PROPERTY
ON WEST SIDE
OF HWY 43

OLIN CORPORATION
PROPERTY LINE
(BOUNDARY OF
OPERABLE UNIT 1)

CBA-CEDAR CORP.

ROUNDUP
OF THE WEEK

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MURKIN 61

0514
443 (short short) -----

STRONG ON
(shown)

1

WINTER 1990

INCORPORATION
BY LINE

-3

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POLLUTION ABATEMENT
P-1000

卷之三

— 6 —

www.english-test.net

100

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THE WAVE MAM

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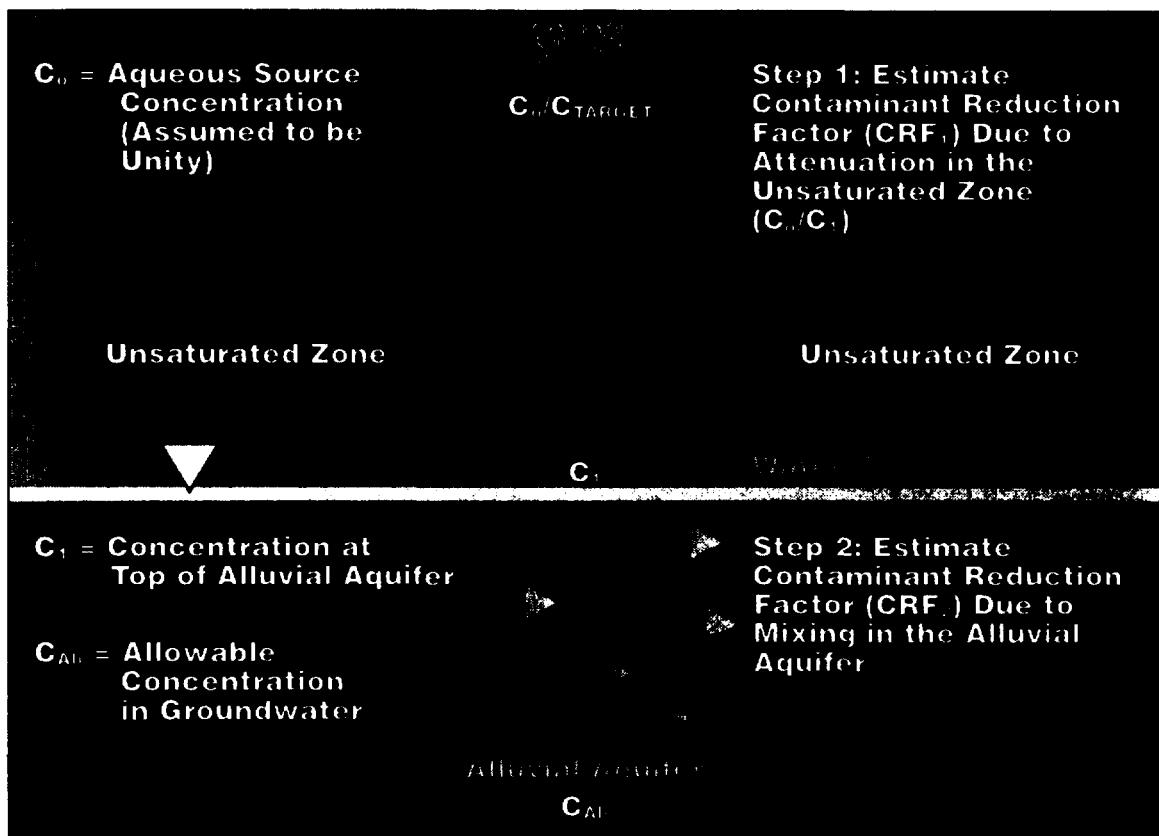
R/F3
MCINTOSH PLANT SITE
WOODWARD-CLYDE CONSULTANTS
Engineers, Planners, Scientists
and Environmental Analysts

OLAN CHEMICALS

SEARCHED **INDEXED** **P.G.O.** **SEARCHED** **4/3/78** **SEARCHED**
AS STATED **INDEXED** **P.G.O.** **SEARCHED** **5-3-78** **SEARCHED**

FACILITY LAYOUT MAP

VALLEY LUMBER CO. 5-



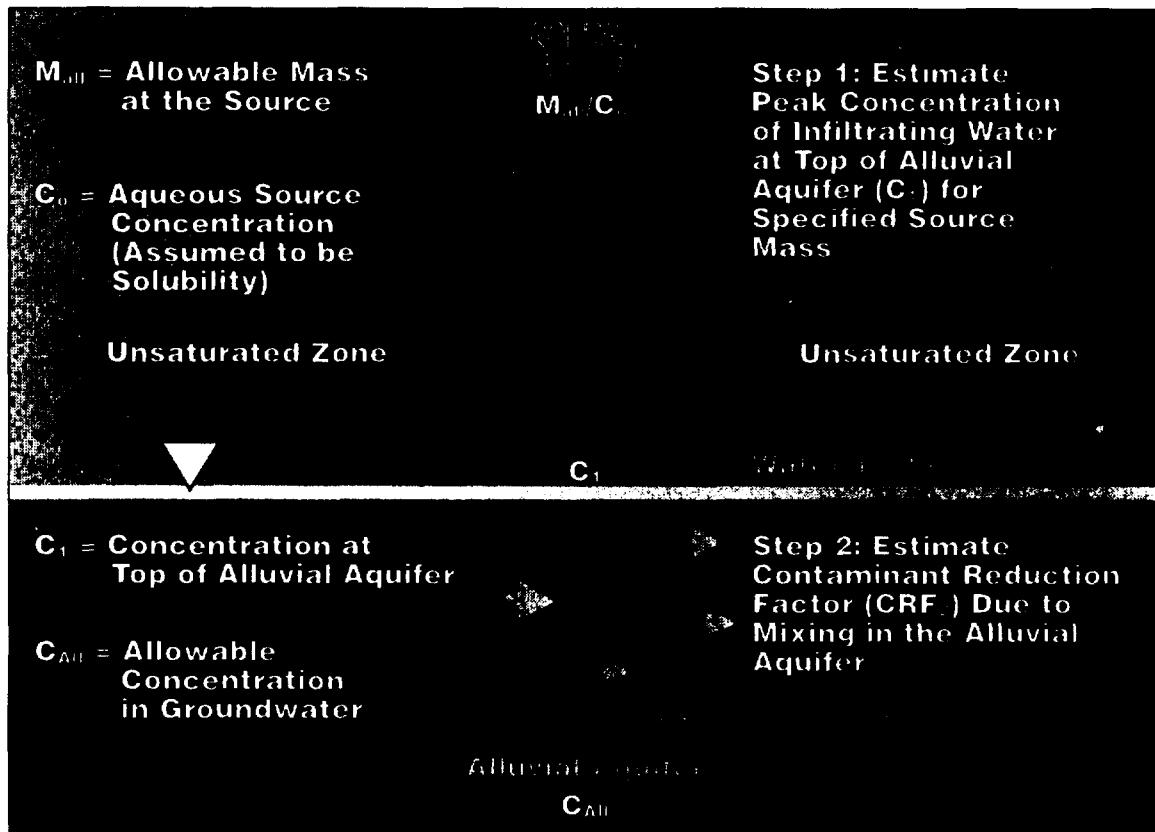
Step 3: Back Calculate Allowable Leachate Concentrations (C_{TARGET}) at Source Based on Allowable Concentrations in Groundwater (C_{AI})

$$C_{TARGET} = (C_{AI}) (CRF_1) (CRF_2)$$

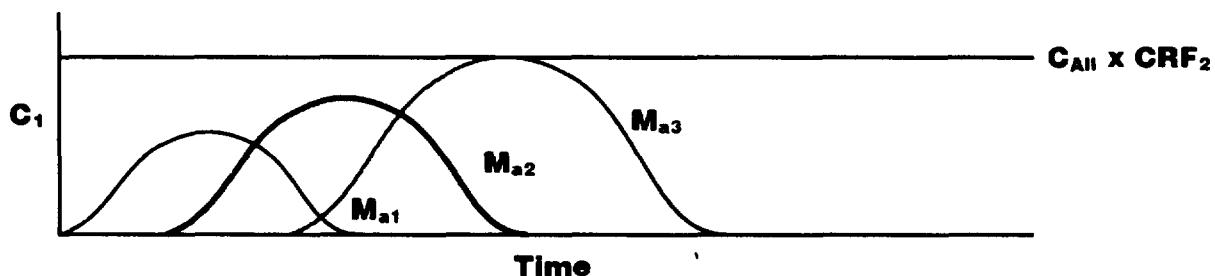
Step 4: Estimate Soil Action Levels (C_{SAL}) Using C_{AI} and the Adsorption Factor (A_d) Which is Based on Chemical Specific Factors and Soil Properties

$$C_{SAL} = (C_{TARGET}) (A_d)$$

3 8 156



Step 3: Simulate Time vs. Concentration Curves For Different Source Masses (M_s) Until C₁ = C_{All} x CRF₂



Step 4: Estimate Soil Action Levels C_{SAL} From the Bulk Density of the Soil (P_b) and the Adsorption Factor (A_d) Which is Based on Chemical-Specific Factors and Soil Properties

$$C_{SAL} = \frac{M_{all}}{A_d P_b}$$

RI/FS MCINTOSH PLANT SITE
Olin CHEMICALS
CHARLESTON, TENNESSEE

Woodward-Clyde
Consultants

Engineering & sciences applied to the earth & its environment

SCALE: NTS	DRAWN BY:D.OLSON	DATE:05/29/93
	CHKD. BY:W.BEAL	DATE:05/29/93

CONCEPTUAL APPROACH TO ESTIMATING SOIL ACTION LEVELS (PESTAN MODEL)

FILE NO.
908449C-T11

FIG. NO.

Woodward-Clyde

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APPENDIX A

**BORING LOGS FROM OLD PLANT
(CPC) LANDFILL AND FORMER
CPC PLANT AREAS**

3 8 156

SAMPLER SYMBOLS



Pushing Split-Spoon



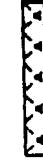
No Recovery



Auger



Shelby tube (California Sampler)



Split-Spoon with blow counts



No sample taken at this interval

LOG OF BORING

PROJECT: RI/FS Phase III
 LOCATION: Olin Chemicals
 McIntosh, Alabama
 CLIENT: Olin Chemical Corporation
 Charleston, Tennessee

BORING: BCP1
 FILE: 90B449C-3F
 DATE: 8/12/92
 TECHNICIAN: F. Sierra
 APPROVED: ✓
 PAGE: 1 of 1

DEPTH (FEET)	SAMPLE	Hollow-stem Augered: Full Depth				3 8 156.
		P.Pen. (lbf)	OVA (ppm)	HNe (ppm)	Recovery (inch)	
0		2.0	N/A	N/A	4	Shell and fill material (FILL)
			BKO	N/A		
2.75		1	N/A		9	Stiff dark brown (7.5YR 4/4) Silty CLAYS, dry (CL)
3.5		BKG	N/A		15	—mottled with red (10R 4/8) and no silt after 2' —with mottled pattern of gray (2.5YR N6) at 4'
3.5		N/A	BKG		12	—gray (2.5Y N6) with red (2.5YR 5/8) iron staining below 6'
3.5		N/A	4		20	
10		46	N/A		1	
12 b/ft		186	N/A		12	Firm light brownish gray (10YR 6/2) Clayey SANDS, dry, with brown yellow (10YR 6/6) iron staining (SC)
12 b/ft		6	N/A		13	—interbedded with clayey silt and with red (2.5YR 4/6) iron staining, 12'- 14' —no clayey silt below 14'
18 b/ft		6	N/A		13	
18 b/ft		5	N/A		20	—firm light gray (10YR 7/1) fine sand, well sorted, dry, 18'- 22'
20 b/ft		21	N/A		22	—slightly clayey at 20'
20 b/ft		15	1		11	—brownish yellow (10YR 5/8), coarse grained, 22'- 24'
21 b/ft		5	1		18	—brownish yellow and light gray (10YR 7/1), 24'- 26'
20 b/ft		6	1		14	—brownish yellow and light gray below 26'
					12	
30		5	0.5		24	
		3	0.5			
						Bottom of boring at 32'. Borehole grouted full depth.

Soil samples retained for lab analysis from 2'-4', 8'-10', 12'-14' and 30'- 32'.

NOTE: Headspace readings shown indicate organic vapor levels, within the headspace sample, above background conditions at that time.

N/A = Not Available

Unified Soil Classifications based on visual observations.

LOG OF BORING

PROJECT: RI/FS Phase III
 LOCATION: Olin Chemicals
 McIntosh, Alabama
 CLIENT: Olin Chemical Corporation
 Charleston, Tennessee

BORING: BCP2
 FILE: 90B449C-3F
 DATE: 8/13/92
 TECHNICIAN: F. Sierra
 APPROVED: vt
 PAGE: 1 of 1

DEPTH (FEET)	SAMPLE	Hollow-stem Augered: Full Depth				3 8 1560
		P.Pen. (lbf)	OVA (ppm)	HNa (ppm)	Recovery (inch)	
0	NR					Shells (FILL)
2.5		2.5	5	0.5	23	Stiff gray (2.5Y N6) and red (10R 4/8) CLAYS, damp (CH)
5		2.5	5	0.25	14	
		2.5	3	0.5	17	
			2	BKG	16	
10	NR		1	0.25	14	Firm brown (10YR 5/3) Clayey SILTS, damp, with iron stains —olive yellow (2.5Y 6/8) below 10' (ML)
		NR	2	0.5		
			4	0.5	12	—becoming clayey below 14'
15	NR		1	BKG		Loose, light gray (10YR 7/1) SILTS, damp (ML)
			1	BKG	10	
20						Bottom of boring at 20'. Borehole grouted full depth.

Soil samples retained for lab analysis from 2'-4', 8'-10', 14'-16' and 18'-20'.

10' Carbon steel casing set from 0'-9'.

NOTE: Headspace readings shown indicate organic vapor levels, within the headspace sample, above background conditions at that time.

N/A = Not Available

Unified Soil Classifications based on visual observations.

LOG OF BORING

PROJECT: RI/FS Phase III
 LOCATION: Olin Chemicals
 McIntosh, Alabama
 CLIENT: Olin Chemical Corporation
 Charleston, Tennessee

BORING: BOP1
 FILE: 90B449C-3F
 DATE: 8/17/92
 TECHNICIAN: F. Sierra
 APPROVED: ✓
 PAGE: 1 of 2

DEPTH (FEET)	SAMPLE	Hollow-stem Augered: Full Depth No free water was encountered during hollow stem augering.				3 8 157
		P.Pen. (in)	OVA (ppm)	H.Nu (ppm)	Recovery (inch)	
0		1.0	BKG	BKG	23	Medium brownish yellow (10YR 6/6) CLAYS, dry (FILL)
		1.5	BKG	BKG	14	
5		1.5	BKG	BKG	13	Medium dark brown (7.5YR 3/2) Silty CLAYS, damp, with roots, rock and shell fragments (FILL)
		1.5	8	BKG	14	—light yellowish brown (2.5Y 6/4) with wood fragments and iron staining below 6'
		1.5	8	2	15	—with 4" white (10YR 8/1) coarse sand and clay pockets at 0.5' —with 6" dark brown (10YR 3/3) soil with roots at 10' ---yellow brown (10YR 5/8) and gray (10YR 6/1) clay, 10.5"- 12' ---with 1" granular, very coarse white material, wet at 11.5"
10		2.0	BKG	BKG	13	Loose dark brown SILT/CLAY, saturated (ML/CH)
		NR	8	7		
15		NR				
		NR				---with sudden drop of tools at 16'- 18'
20		NR				
25		2.5	3.6	100	8	Stiff gray (5Y 6/1), and yellowish brown (10YR 5/8) CLAYS (CH)
		NR	N/A	N/A	11	
			268	77		
30		3.0	493	173	13	—gray (5Y 6/1) with ferrous stains below 26'
			53	2	18	Interbedded medium gray (5YR 6/1) CLAYS, dry, with iron staining and light gray (5YR 7/1) loose fine SANDS (CH/ML)
			243	63	14	Loose reddish yellow (5YR 7/6) fine SANDS, well sorted, dry (ML)
			63	18	12	
			73	18	13	
35			891	399	14	
			141	59	14	---coarse below 38'
40						

Soil samples retained for lab analysis from 10'-12', 12'-21', 26'-28', 38'-40' and 46'-48'.

8" Carbon steel casing set from 0'-23'.

NOTE: Headspace readings shown indicate organic vapor levels, within the headspace sample, above background conditions at that time.

NR = No Recovery

N/A = Not Available

Unified Soil Classifications based on visual observations.

Continued Next Page



Woodward-Clyde Consultants

LOG OF BORING

PROJECT: RI/FS Phase III
 LOCATION: Olin Chemicals
 McIntosh, Alabama
 CLIENT: Olin Chemical Corporation
 Charleston, Tennessee

BORING: BOP1
 FILE: 90B449C-3F
 DATE: 8/17/92
 TECHNICIAN: F. Sierra
 APPROVED: VP
 PAGE: 2 of 2

DEPTH (FEET)	SAMPLE					Description of Stratum
		P.Pen. (tsf)	OVA (ppm)	HNu (ppm)	Recovery (inch)	
40			306	189	15	Loose reddish yellow (SYR 7/6) fine SANDS, well sorted, dry —wet below 41'
			441	109	6	
45			141	30	16	
					20	
						Bottom of boring at 48'. Borehole grouted full depth.

Unified Soil Classifications based on visual observations.



LOG OF BORING

PROJECT: RI/FS Phase III
 LOCATION: Olin Chemicals
 McIntosh, Alabama
 CLIENT: Olin Chemical Corporation
 Charleston, Tennessee

BORING: BOP2
 FILE: 90B449C-3F
 DATE: 8/18/92
 TECHNICIAN: F. Sierra
 APPROVED: VP.
 PAGE: 1 of 1

DEPTH (FEET)	SAMPLE	Hollow-stem Augered: Full Depth No free water was encountered during hollow-stem augering.				3 8 1572
		P.Pen. (lsf)	OVA (ppm)	HNu (ppm)	Recovery (inch)	
0		2.0	N/A	N/A	22	Stiff gray (10YR 6/1) and yellow brown (10YR 5/8) CLAYS, blocky with grass roots, dry (FILL)
	NR		N/A	N/A		White (10YR 8/1) brine well sand, dry lime and fragments of brine well sand (FILL)
5	NR		N/A	N/A		
	NR		N/A	N/A		
			N/A	N/A	14	--with layers of lime and dark gray (5YR 3/1) soil with roots, 8'- 12'
10			N/A	N/A	8	--with yellowish brown (10YR 5/8) and gray (10YR 6/1) clay at 11'
			N/A	N/A	14	Very soft dark brown (7.5YR 4/2) CLAYS with sand and roots, very wet (CH)
15	NR		N/A	N/A		Loose yellowish red (5YR 5/8) SILT/CLAY, saturated (ML/CH)
	NR					
17.5		0.75	8	2	12	Soft gray (10YR 6/1) and red (10YR 4/8) CLAYS, dry (CH)
20		2.0	3	BKG	18	--stiff below 20'
			BKG	BKG	20	Loose brownish yellow (10YR 5/8) fine SANDS, dry (ML)
			3	0.5	10	--yellow (10YR 7/8) medium sands
			0.5	BKG	20	--fine
			7	0.5	20	--medium
			3	0.4	20	--white (10YR 8/2) below 28'
			3	0.9	20	
			5	0.6	24	
			5	0.8	18	--coarse
			8	1.9	18	--very coarse, gravelly, wet
						Bottom of boring at 40'. Borehole grouted full depth.
40						

Soil samples retained for lab analysis from 2'-8', 18'-19', 20'-21', 28'-30' and 38'-40'.

8" Carbon steel casing set from 0'- 19'.

NOTE: Headspace readings shown indicate organic vapor levels, within the headspace sample, above background conditions at that time.

N/A = Not Available

Unified Soil Classifications based on visual observations.

LOG OF BORING

PROJECT: RI/FS Phase III
 LOCATION: Olin Chemicals
 McIntosh, Alabama
 CLIENT: Olin Chemical Corporation
 Charleston, Tennessee

BORING: BOP3
 FILE: 90B449C-3F
 DATE: 9/1/92
 TECHNICIAN: F. Sierra
 APPROVED: VP
 PAGE: 1 of 2

DEPTH (FEET)	SAMPLE	Hollow-stem Augered: Full Depth				
		P.Pen. (lbf)	OVA (ppm)	HNU (ppm)	Recovery (inch)	Description of Stratum
0		1.5			19	Topsoil Medium reddish yellow (7.5YR 6/8) and gray (7.5YR N6) CLAYS with grass and roots, dry (FILL)
		1.5			12	
5		1.0			12	Medium reddish yellow, gray and dark brown (7.5YR 3/4) Silty CLAYS (FILL)
					19	—dark yellowish brown (10YR 3/4) with shell and rock fragments, 5'- 6' —soft below 6' —black (SY 2.5/2) at 7'
10		2.5			16	Stiff gray (2.5YR N5) and red (2.5YR 4/8) CLAYS, dry (CH)
		3.5			20	—with small pockets of silty clay at 9'
15		3.0	45	0.5	8	
		3.0	46	BKG	21	—with thin (1/2") lenses of silty clay, 15'- 18'
20		3.0	71	0.5	12	
		3.0	21	0.5	10	—with some very small pockets of silty clay and ferrous stains at 18'
25		2.5	10	0.5	23	
		2.0	6	0.5	13	—with a layer of silty clay and small silty clay pockets at 22'
		2.0	5	0.5	24	
30						Loose strong brown (7.5YR 5/8) coarse SANDS, dry to damp (SP)
					8	—white (SY 8/2) below 26'
35					8	
					16	
					8	
40					24	
					10	—reddish yellow (7.5YR 6/6) below 36'
					14	—wet and very coarse with gravel below 39'

Soil samples retained for lab analysis from 4'-5', 24'-25', 38'-40' and 40'-42'.

8" Carbon steel casing set from 0'-11'.

NOTE: Headspace readings shown indicate organic vapor levels, within the headspace sample, above background conditions at that time.

N/A = Not Available

NR = No Recovery

Unified Soil Classifications based on visual observations.

Continued Next Page

LOG OF BORING

PROJECT: RI/FS Phase III
 LOCATION: Olin Chemicals
 McIntosh, Alabama
 CLIENT: Olin Chemical Corporation
 Charleston, Tennessee

BORING: BOP3
 FILE: 90B449C-3F
 DATE: 9/1/92
 TECHNICIAN: F. Sierra
 APPROVED: VP.
 PAGE: 2 of 2

DEPTH (FEET)	SAMPLE					Description of Stratum
		P.Pen. (tsf)	OVA (ppm)	HNu (ppm)	Recovery (inch)	
40			3	1	12	Loose reddish yellow (7.5YR 6/6) coarse SANDS with gravel (SP)
NR						
NR						
45						Bottom of boring at 43'. Borehole grouted full depth.

Unified Soil Classifications based on visual observations.



LOG OF BORING

PROJECT: RI/FS Phase III
 LOCATION: Olin Chemicals
 McIntosh, Alabama
 CLIENT: Olin Chemical Corporation
 Charleston, Tennessee

BORING: BOP4
 FILE: 90B449C-3F
 DATE: 8/31/92
 TECHNICIAN: F. Sierra
 APPROVED: ✓
 PAGE: 1 of 1

Hollow-stem Augered: Full Depth
 No free water was encountered during hollow-stem augering.

3 8 1575

DEPTH (FEET)	SAMPLE	P.Pen. (tsf)	OVA (ppm)	HNu (ppm)	Recovery (inch)	Description of Stratum
0		2.0			18	Dark brown (7.5YR 3/2) Soil with roots (FILL) Medium strong brown (7.5YR 5/8) and gray (7.5YR N6) CLAYS with roots, dry (FILL)
5	NR				14	Dark brown (7.5YR 3/2) Silty CLAYS with sand, shell, wood fragments, rocks, brine well sand and metal scraps (FILL) —with very soft strong brown (7.5YR 5/8) clay with plastic and glass fragments at 4' —with large pieces of metal, wood and white powder at 6'
10	NR					Loose dark brown (7.5YR 4/2) SILT/CLAY, saturated (ML/CH)
15	NR					
15		3.0			20	Stiff gray (5YR 6/1) and red (10R 4/8) CLAYS (CH)
15		3.5			20	
18	3.0	140	89		22	
20	2.0	390	169		24	
20			170	250	22	Interbedded Clayey SILTS and reddish yellow (7.5YR 6/8) fine SANDS, dry (ML/SP)
20			120	103	20	
25						Reddish yellow (7.5YR 6/8) fine SANDS, dry (SP)
25		15	5		14	—coarse, 24'-36'
28		2	1			—reddish yellow (7.5YR 6/8) and pink (7.5YR 8/4) below 28'
30		18	5			
30		15	3.5		14	
30		1	1.5		10	
35		4	2		12	
35		5	1		24	—fine below 36' —with a 2" layer of clayey sand, damp at 39'
38		1.5	1		24	Bottom of boring at 40'. Borehole grouted full depth.
40						

Soil samples retained for lab analysis from 4'-6', 18'-20', 20'-22' and 38'-40'. 8" Carbon steel casing set from 0'-15'.

NOTE: Headspace readings shown indicate organic vapor levels, within the headspace sample, above background conditions at that time.

N/A = Not Available

NR = No Recovery

Unified Soil Classifications based on visual observations.

Woodward-Clyde

3 8 1571

APPENDIX B
CONTAMINATED MASS CALCULATIONS

FORMER CPC PLANT AREA

3 8 1577

1,2,4-TRICHLOROBENZENE

	UNIT SAMPLED	THICKNESS (m)	AREA (m ²)	DENSITY (kg/m ³)	AVE. CONC. (mg/kg)	MASS (kg)
BCP1	CLAY	2.13	2555.00	1590	350.65	3034.18
	UPPER SAND	0.91	2555.00	1720	8.5	33.99
	LOW. SAND	0.00	2555.00	1720	0	0.00
TOTAL						3068.17

1,2-DICHLOROBENZENE

	UNIT SAMPLED	THICKNESS (m)	AREA (m ²)	DENSITY (kg/m ³)	AVE. CONC. (mg/kg)	MASS (kg)
BCP1	CLAY	2.13	2555.00	1590	15	129.80
	UPPER SAND	0.91	2555.00	1720	3.5	14.00
	LOW. SAND	0.00	2555.00	1720	0	0.00
TOTAL						143.79

1,3-TRICHLOROBENZENE

	UNIT SAMPLED	THICKNESS (m)	AREA (m ²)	DENSITY (kg/m ³)	AVE. CONC. (mg/kg)	MASS (kg)
BCP1	CLAY	2.13	2555.00	1590	1.25	10.82
	UPPER SAND	0.91	2555.00	1720	0.22	0.88
	LOW. SAND	0.00	2555.00	1720	0	0.00
TOTAL						11.70

1,4-TRICHLOROBENZENE

	UNIT SAMPLED	THICKNESS (m)	AREA (m ²)	DENSITY (kg/m ³)	AVE. CONC. (mg/kg)	MASS (kg)
BCP1	CLAY	2.13	2555.00	1590	1.2	10.38
	UPPER SAND	0.91	2555.00	1720	2.2	8.80
	LOW. SAND	0.00	2555.00	1720	0	0.00
TOTAL						19.18

BENZENE

	UNIT SAMPLED	THICKNESS (m)	AREA (m ²)	DENSITY (kg/m ³)	AVE. CONC. (mg/kg)	MASS (kg)
BCP1	CLAY	2.13	2555.00	1590	0.0015	0.01
	UPPER SAND	0.91	2555.00	1720	0	0.00
	LOW. SAND	0.00	2555.00	1720	0	0.00
TOTAL						0.01

CHLOROBENZENE

	UNIT SAMPLED	THICKNESS (m)	AREA (m ²)	DENSITY (kg/m ³)	AVE. CONC. (mg/kg)	MASS (kg)
BCP1	CLAY	2.13	2555.00	1590	0.313	2.71
	UPPER SAND	0.91	2555.00	1720	0.4	1.60
	LOW. SAND	0.00	2555.00	1720	0	0.00
TOTAL						4.31

OLD PLANT (CPC) LANDFILL

BENZENE							
	UNIT SAMPLED	THICKNESS (m)	AREA (m ²)	DENSITY (kg/m ³)	AVE. CONC. (mg/kg)	MASS (kg)	TOTAL MASS (kg)
BOP1	WASTE	3.66	2787.09	1590	0.00	0.00	
	LOOSE SI/CL	2.74	2787.09	1590	2.40	29.18	
	CLAY	1.98	2787.09	1590	3.30	28.97	
	SAND	3.98	2787.09	1720	1.15	21.96	
							80.11
BOP2	WASTE	4.27	2787.09	1590	0.00	0.00	
	CLAY	2.13	2787.09	1590	0.03	0.28	
	SAND	5.09	2787.09	1720	0.00	0.00	
							0.28
BOP3	WASTE	2.44	2787.09	1590	0.00	0.00	
	CLAY	5.18	2787.09	1590	0.00	0.00	
	SAND	4.06	2787.09	1720	0.00	0.00	
							0.00
BOP4	WASTE	2.44	2787.09	1590	0.00	0.00	
	CLAY	3.66	2787.09	1590	0.00	0.00	
	SAND	6.18	2787.09	1720	0.00	0.00	
							0.00
							80.39

SUMMARY		ALL BORINGS	BOP1 + BOP4 (WEST)	BOP2+BOP3 (EAST)
(MASS IN kg)				
	WASTE	0.00	0.00	0.00
	LOOSE SI/CL	29.18	29.18	---
	CLAY	29.26	28.97	0.28
	SAND	21.96	21.96	0.00
	ALL UNITS	80.39	80.11	0.28

OLD PLANT (CPC) LANDFILL

CHLOROBENZENE							
	UNIT SAMPLED	THICKNESS (m)	AREA (m ²)	DENSITY (kg/m ³)	AVE. CONC. (mg/kg)	MASS (kg)	TOTAL MASS (kg)
BOP1	WASTE	3.66	2787.09	1590	6.300	102.11	
	LOOSE SI/CL	2.74	2787.09	1590	60.000	729.39	
	CLAY	1.98	2787.09	1590	7.300	64.09	
	SAND	3.98	2787.09	1720	34.000	649.31	1544.90
BOP2	WASTE	4.27	2787.09	1590	0.004	0.08	
	CLAY	2.13	2787.09	1590	0.075	0.70	
	SAND	5.09	2787.09	1720	0.001	0.02	0.80
BOP3	WASTE	2.44	2787.09	1590	0.057	0.62	
	CLAY	5.18	2787.09	1590	0.007	0.16	
	SAND	4.06	2787.09	1720	0.000	0.00	0.78
BOP4	WASTE	2.44	2787.09	1590	9.700	104.82	
	CLAY	3.66	2787.09	1590	1.800	29.18	
	SAND	6.18	2787.09	1720	23.000	681.20	815.19
2361.67							

SUMMARY (MASS IN kg)		ALL BORINGS	BOP1 + BOP4 (WEST)	BOP2+BOP3 (EAST)
	WASTE	207.62	206.93	0.69
	LOOSE SI/CL	729.39	729.39	----
	CLAY	94.13	93.27	0.87
	SAND	1330.53	1330.51	0.02
	ALL UNITS	2361.67	2360.09	1.58

OLD PLANT (CPC) LANDFILL

1,2-DICHLOROBENZENE							
	UNIT SAMPLED	THICKNESS (m)	AREA (m ²)	DENSITY (kg/m ³)	AVE. CONC. (mg/kg)	MASS (kg)	TOTAL MASS (kg)
BOP1	WASTE	3.66	2787.09	1590	2.900	47.00	
	LOOSE SI/CL	2.74	2787.09	1590	120.000	1458.77	
	CLAY	1.98	2787.09	1590	1.800	15.80	
	SAND	3.98	2787.09	1720	6.950	132.73	1654.30
BOP2	WASTE	4.27	2787.09	1590	0.000	0.00	
	CLAY	2.13	2787.09	1590	0.000	0.00	
	SAND	5.09	2787.09	1720	0.000	0.00	0.00
BOP3	WASTE	2.44	2787.09	1590	110.000	1188.63	
	CLAY	5.18	2787.09	1590	0.000	0.00	
	SAND	4.06	2787.09	1720	0.000	0.00	1188.63
BOP4	WASTE	2.44	2787.09	1590	2.100	22.69	
	CLAY	3.66	2787.09	1590	57.000	923.89	
	SAND	6.18	2787.09	1720	65.000	1925.14	2871.72
5714.65							

SUMMARY		ALL BORINGS	BOP1 + BOP4 (WEST)	BOP2+BOP3 (EAST)
(MASS IN kg)				
	WASTE	1258.32	69.70	1188.63
	LOOSE SI/CL	1458.77	1458.77	---
	CLAY	939.69	939.69	0.00
	SAND	2057.86	2057.86	0.00
	ALL UNITS	5714.65	4526.02	1188.63

OLD PLANT (CPC) LANDFILL

1,3-DICHLOROBENZENE							
	UNIT SAMPLED	THICKNESS (m)	AREA (m ²)	DENSITY (kg/m ³)	AVE. CONC. (mg/kg)	MASS (kg)	TOTAL MASS (kg)
BOP1	WASTE	3.66	2787.09	1590	0.160	2.59	
	LOOSE SI/CL	2.74	2787.09	1590	7.100	86.31	
	CLAY	1.98	2787.09	1590	0.000	0.00	
	SAND	3.98	2787.09	1720	0.215	4.11	93.01
BOP2	WASTE	4.27	2787.09	1590	0.000	0.00	
	CLAY	2.13	2787.09	1590	0.000	0.00	
	SAND	5.09	2787.09	1720	0.000	0.00	0.00
BOP3	WASTE	2.44	2787.09	1590	6.600	71.32	
	CLAY	5.18	2787.09	1590	0.000	0.00	
	SAND	4.06	2787.09	1720	0.000	0.00	71.32
BOP4	WASTE	2.44	2787.09	1590	1.900	20.53	
	CLAY	3.66	2787.09	1590	5.000	81.04	
	SAND	6.18	2787.09	1720	5.500	162.90	264.47
							428.80

SUMMARY		ALL BORINGS	BOP1 + BOP4 (WEST)	BOP2+BOP3 (EAST)
(MASS IN kg)				
	WASTE	94.44	23.12	71.32
	LOOSE SI/CL	86.31	86.31	---
	CLAY	81.04	81.04	0.00
	SAND	167.00	167.00	0.00
	ALL UNITS	428.80	357.48	71.32

OLD PLANT (CPC) LANDFILL

1,4-DICHLOROBENZENE							
	UNIT SAMPLED	THICKNESS (m)	AREA (m ²)	DENSITY (kg/m ³)	AVE. CONC. (mg/kg)	MASS (kg)	TOTAL MASS (kg)
BOP1	WASTE	3.66	2787.09	1590	2.700	43.76	
	LOOSE SI/CL	2.74	2787.09	1590	120.000	1458.77	
	CLAY	1.98	2787.09	1590	2.200	19.32	
	SAND	3.98	2787.09	1720	11.750	224.39	1746.24
BOP2	WASTE	4.27	2787.09	1590	0.000	0.00	
	CLAY	2.13	2787.09	1590	0.000	0.00	
	SAND	5.09	2787.09	1720	0.000	0.00	0.00
BOP3	WASTE	2.44	2787.09	1590	120.000	1296.69	
	CLAY	5.18	2787.09	1590	0.000	0.00	
	SAND	4.06	2787.09	1720	0.000	0.00	1296.69
BOP4	WASTE	2.44	2787.09	1590	17.000	183.70	
	CLAY	3.66	2787.09	1590	74.000	1199.43	
	SAND	6.18	2787.09	1720	75.000	2221.31	3604.44
							6647.37

SUMMARY		ALL BORINGS	BOP1 + BOP4 (WEST)	BOP2+BOP3 (EAST)
(MASS IN kg)				
	WASTE	1524.15	227.46	1296.69
	LOOSE SI/CL	1458.77	1458.77	---
	CLAY	1218.75	1218.75	0.00
	SAND	2445.71	2445.71	0.00
	ALL UNITS	6647.37	5350.69	1296.69

OLD PLANT (CPC) LANDFILL

1,2,4-TRICHLOROBENZENE							
	UNIT SAMPLED	THICKNESS (m)	AREA (m ²)	DENSITY (kg/m ³)	AVE. CONC. (mg/kg)	MASS (kg)	TOTAL MASS (kg)
BOP1	WASTE	3.66	2787.09	1590	0.750	12.16	
	LOOSE SI/CL	2.74	2787.09	1590	30.000	364.69	
	CLAY	1.98	2787.09	1590	0.000	0.00	
	SAND	3.98	2787.09	1720	2.695	51.47	428.32
BOP2	WASTE	4.27	2787.09	1590	0.000	0.00	
	CLAY	2.13	2787.09	1590	0.000	0.00	
	SAND	5.09	2787.09	1720	0.000	0.00	0.00
BOP3	WASTE	2.44	2787.09	1590	20.000	216.11	
	CLAY	5.18	2787.09	1590	0.000	0.00	
	SAND	4.06	2787.09	1720	0.000	0.00	216.11
BOP4	WASTE	2.44	2787.09	1590	6.400	69.16	
	CLAY	3.66	2787.09	1590	0.710	11.51	
	SAND	6.18	2787.09	1720	0.800	23.69	104.36
							748.79

SUMMARY (MASS IN kg)		ALL BORINGS	BOP1 + BOP4 (WEST)	BOP2+BOP3 (EAST)
	WASTE	297.43	81.31	216.11
	LOOSE SI/CL	364.69	364.69	----
	CLAY	11.51	11.51	0.00
	SAND	75.16	75.16	0.00
	ALL UNITS	748.79	532.67	216.11

OLD PLANT (CPC) LANDFILL

MERCURY							
	UNIT SAMPLED	THICKNESS (m)	AREA (m ²)	DENSITY (kg/m ³)	AVE. CONC. (mg/kg)	MASS (kg)	TOTAL MASS (kg)
BOP1	WASTE	3.66	2787.09	1590	0	0.00	
	LOOSE SI/CL	2.74	2787.09	1590	0.42	5.11	
	CLAY	1.98	2787.09	1590	0	0.00	
	SAND	3.98	2787.09	1720	0	0.00	5.11
BOP2	WASTE	4.27	2787.09	1590	57.1	1079.76	
	CLAY	2.13	2787.09	1590	0.31	2.93	
	SAND	5.09	2787.09	1720	0	0.00	1082.69
BOP3	WASTE	2.44	2787.09	1590	21.7	234.48	
	CLAY	5.18	2787.09	1590	0	0.00	
	SAND	4.06	2787.09	1720	0	0.00	234.48
BOP4	WASTE	2.44	2787.09	1590	406	4387.12	
	CLAY	3.66	2787.09	1590	0	0.00	
	SAND	6.18	2787.09	1720	0	0.00	4387.12
5709.40							

SUMMARY		ALL BORINGS	BOP1 + BOP4 (WEST)	BOP2+BOP3 (EAST)
(MASS IN kg)				
	WASTE	5701.36	4387.12	1314.24
	LOOSE SI/CL	5.11	5.11	---
	CLAY	2.93	0.00	2.93
	SAND	0.00	0.00	0.00
	ALL UNITS	5709.40	4392.22	1317.18

Woodward-Clyde

3 8 153

APPENDIX C

GROUNDWATER GRADIENT CALCULATIONS

3 8 1500

Project Notes

Project Name: Olin McIntosh

Project No.: 90544TC

Task No.: 11 File No.: _____

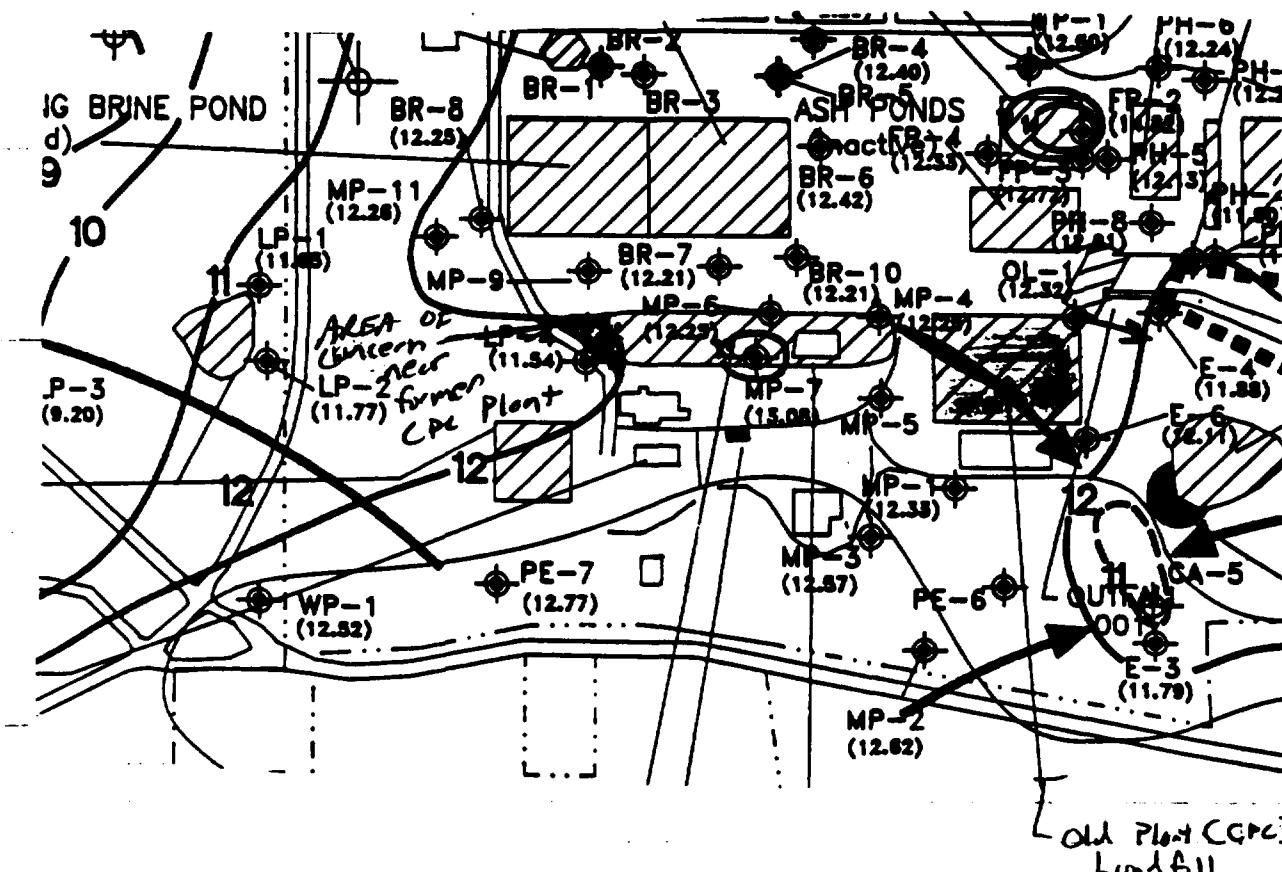
Sheet _____ of _____

HORIZONTAL GRADIENT
WMAZ Date: 5/25/93
DER Date: 5-25-93

PURPOSE - TO ESTIMATE THE HORIZONTAL GRADIENT
IN THE VICINITY OF THE OLD PLANT (CPL)
LANDFILL AND FORMER CPL PLANT
AREA FOR THE ALLUVIAL AQUIFER.

PROCEDURE - GRADIENT MEASUREMENTS WERE
TAKEN AT SEVERAL LOCATIONS AROUND
BOTH AREAS FOR BOTH THE UPPER AND
LOWER ZONES OF THE AQUIFER.

POTENTIAL FIELD MAP OF 100' DEEP ZONE - SEPTEMBER 1991
FIGURE 3-11a OF RI DRAFT R1 REPORT (Feb 1993)
SCALE 1" = 500'



OLD PLANT (CPL) LANDFILL AREA
From MP-4 to E-6 12.25-12.11 = 0.0001

680

From OL-1 to EAST 12.32-12.0 = 0.0017

190

3 8 1587

HORIZONTAL GRADIENT

AB Date: 5/25/93

checked By: DER Date: 5-25-93

Project Name: OIL & GAS TEST

Project No.: 30844FC

Task No.: 11 File No.:

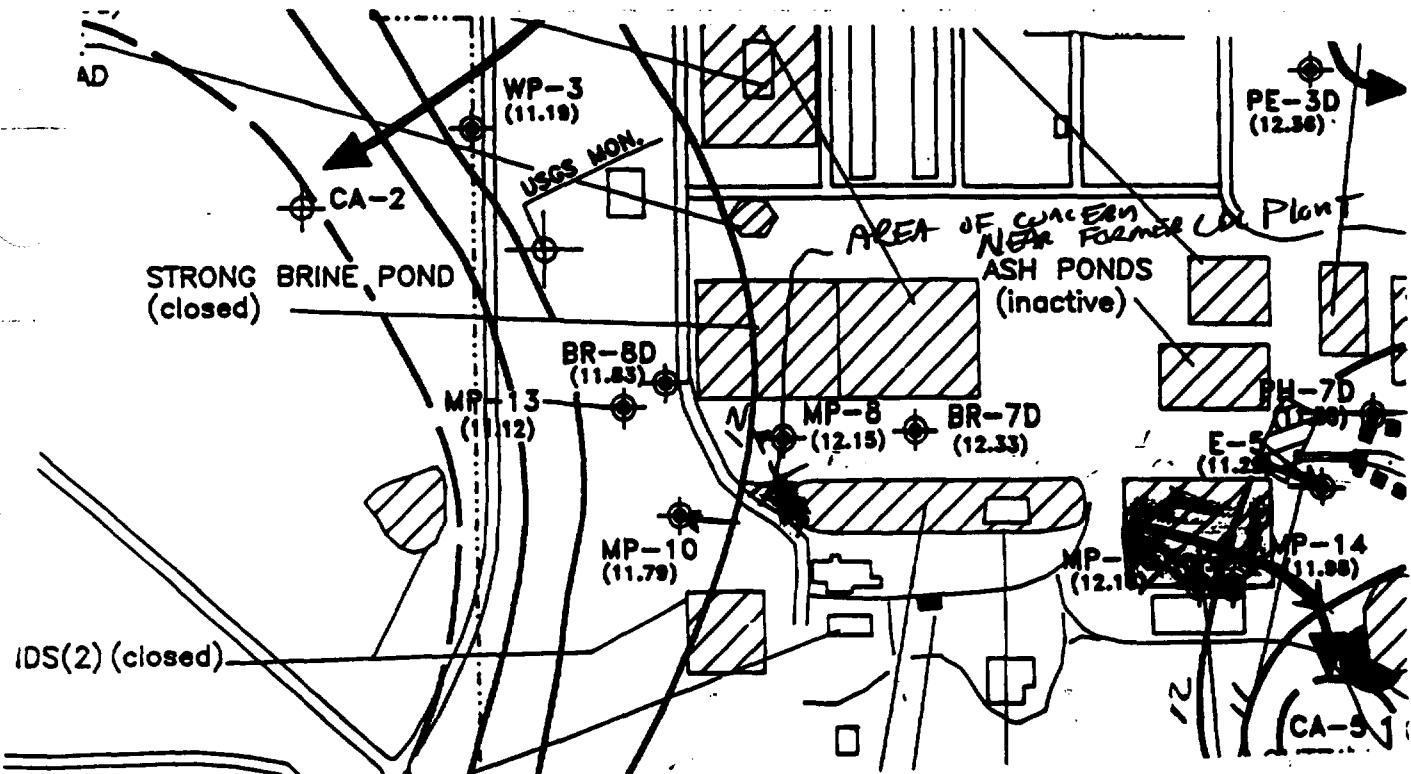
Sheet 2 of 3

AGL - UPPER ZONE = 0.000

Former CPC PLANT AREA

SOUTHWEST FLOW $\frac{12-11.54}{80} = 0.0058$

POTENTIOMETRIC MAP OF LOWER ZONE - SEPTEMBER 1991
FIGURE 3-12 OF RI DRAFT - RI REPORT (Feb 1993)
SCALE 1" = 500'



OLD PLANT (CPC) LANDFILE (LOWER ZONE)
SOUTHEAST CORNER

SOUTHEAST CORNER $\frac{12-11}{250} = 0.004 \text{ ft/ft}$

NORTHEAST CORNER
 $\frac{12-11.22}{780} = 0.0043$

AGL LOWER ZONE 0.004

**Woodward-Clyde
Consultants**

Project Notes

Project Name: Olin McIntosh
Project No.: 50844/9C
Task No.: 11 File No.: _____
Sheet 3 of 3

Horizon Mr 6220151T
- TAB Date: 5/25/93
checked By: DER Date: 5-25-93

FORMER CPC PLANT AREA

3 8 15

WESTERLY ROW
12 contour to MP - 10

$$\frac{12 - 11.75}{150} = 0.0017$$

MP - 8 to 12 contour
$$\frac{12.15 - 12}{75} = 0.002$$

AVERAGE = 0.002

Summary

OLD PLANT CPC LANDFILL

AVE GRADIENT FOR UPPER ZONE = 0.0009

AVE GRADIENT FOR LOWER ZONE = 0.004

SELECTED GRADIENT (AW) = 0.0025 EAST/SE

Former CPC PLANT AREA

GRADIENT FOR UPPER ZONE = 0.00075

AVE GRADIENT FOR LOWER ZONE = 0.002

SELECTED GRADIENT (AW) = 0.004 WEST

Woodward-Clyde

3 8 153

APPENDIX D

SOLUTE AND PESTAN MODELING DATA

Filename Identification System

3 8 1516

First Character: S or P

S = Solute run
P = Pestan run

Second Character: P or L

P = Former CPC Plant Area
L = Old Plant (CPC) Landfill Area

3rd through 5th characters: Three letters of chemical name

BEN = Benzene
CHB = Chlorobenzene
12D = 1,2 Dichlorobenzene
13D = 1,3 Dichlorobenzene
14D = 1,4 Dichlorobenzene
124 = 1,2,4 Trichlorobenzene
MER = Mercury

6th Character: B or 1

B = no decay
1 = with decay

Example: Filename SPBEN1

Contents: Solute run
Plant area
Chemical: Benzene
With decay

Woodward-Clyde

3 8 1521

OLD PLANT (CPC) LANDFILL AREA

**SOLUTE RUNS
NO DECAY**

CONCENTRATION C [mg/l]

ONED	TIME [y]	1 DISTANCE 6.83 [m]	3	8	1502
INTERNATIONAL GROUND WATER MODELING CENTER Golden, Colorado, USA - Delft, The Netherlands					
SOLUTE version 2.03	5.0000	0.0000	285.0000	0.4613	
ANALYTICAL MODELS FOR SOLUTE TRANSPORT	10.0000	0.0000	290.0000	0.4552	
	15.0000	0.0000	295.0000	0.4488	
	20.0000	0.0000	300.0000	0.4422	
	25.0000	0.0000	305.0000	0.4353	
	30.0000	0.0000	310.0000	0.4282	
	35.0000	0.0000	315.0000	0.4209	
	40.0000	0.0002	320.0000	0.4135	
PROJECT..... = SLBENB.INP	45.0000	0.0005	325.0000	0.4059	
USER NAME..... = ASIERRA	50.0000	0.0014	330.0000	0.3983	
DATE..... = 06-03-1993	55.0000	0.0031	335.0000	0.3906	
DATA FILE..... = C:\OLIN\SLBENB.INP	60.0000	0.0061	340.0000	0.3828	
	65.0000	0.0107	345.0000	0.3750	
	70.0000	0.0172	350.0000	0.3672	
	75.0000	0.0258	355.0000	0.3594	
INPUT DATA:	80.0000	0.0367	360.0000	0.3517	
	85.0000	0.0499	365.0000	0.3439	
	90.0000	0.0653	370.0000	0.3362	
GROUNDWATER (SEEPAGE) VELOCITY = .2339 [m/y]	95.0000	0.0826	375.0000	0.3286	
LONGITUDINAL DISPERSIVITY.... = .68 [m]	100.0000	0.1017	380.0000	0.3210	
RETARDATION FACTOR..... = 5.69	105.0000	0.1226	385.0000	0.3135	
INITIAL CONCENTRATION..... = 0 [mg/l]	110.0000	0.1445	390.0000	0.3061	
CONCENTRATION AT SOURCE..... = 1 [mg/l]	115.0000	0.1671	395.0000	0.2988	
INITIAL TIME..... = 0 [y]	120.0000	0.1904	400.0000	0.2916	
LENGTH OF TIME STEP..... = 5 [y]	125.0000	0.2139			
NUMBER OF TIME STEPS..... = 80	130.0000	0.2373			
NUMBER OF OBSERVATION POINTS.. = 1	135.0000	0.2605			
1 DISTANCE (from source). = 6.83 [m]	140.0000	0.2831			
DURATION OF SOLUTE PULSE..... = 100000000 [y]	145.0000	0.3051			
HALF-LIFE (0 if no decay)..... = 0 [y]	150.0000	0.3261			
DECAY CONSTANT (lambda)..... = .00000+00 [1/y]	155.0000	0.3462			
HALF-LIFE at Source..... = 117.9 [y]	160.0000	0.3650			
DECAY CONSTANT (alpha)..... = .5879D-02 [1/y]	165.0000	0.3827			
	170.0000	0.3991			
	175.0000	0.4141			
	180.0000	0.4278			
	185.0000	0.4401			
	190.0000	0.4511			
	195.0000	0.4607			
	200.0000	0.4690			
	205.0000	0.4761			
	210.0000	0.4820			
	215.0000	0.4866			
	220.0000	0.4902			
	225.0000	0.4927			
	230.0000	0.4942			
	235.0000	0.4947			
	240.0000	0.4944			
	245.0000	0.4932			
	250.0000	0.4913			
	255.0000	0.4887			
	260.0000	0.4855			
	265.0000	0.4816			
	270.0000	0.4772			
	275.0000	0.4723			
	280.0000	0.4670			

CONCENTRATION C [mg/l]

ONED	TIME [y]	1 DISTANCE 6.83 [m]	C [mg/l]
INTERNATIONAL GROUND WATER MODELING CENTER Golden, Colorado, USA - Delft, The Netherlands	10.0000	0.0000	570.0000 0.4935
SOLUTE version 2.03	20.0000	0.0000	580.0000 0.4919
ANALYTICAL MODELS FOR SOLUTE TRANSPORT	30.0000	0.0000	590.0000 0.4898
	40.0000	0.0000	600.0000 0.4872
	50.0000	0.0000	610.0000 0.4841
	60.0000	0.0000	620.0000 0.4806
	70.0000	0.0000	630.0000 0.4768
	80.0000	0.0000	640.0000 0.4726
	90.0000	0.0001	650.0000 0.4680
	100.0000	0.0003	660.0000 0.4632
PROJECT..... = SLCHBB.INP	110.0000	0.0008	670.0000 0.4580
USER NAME.... = ASIERRA	120.0000	0.0018	680.0000 0.4527
DATE..... = 06-03-1993	130.0000	0.0036	690.0000 0.4471
DATA FILE.... = C:\OLIN\SLCHBB.INP	140.0000	0.0062	700.0000 0.4413
INPUT DATA:	150.0000	0.0101	710.0000 0.4354
GROUNDWATER (SEEPAGE) VELOCITY = .2339 [m/y]	160.0000	0.0154	720.0000 0.4293
LONGITUDINAL DISPERSIVITY.... = .68 [m]	170.0000	0.0222	730.0000 0.4230
RETARDATION FACTOR..... = 13.24	180.0000	0.0307	740.0000 0.4167
INITIAL CONCENTRATION..... = 0 [mg/l]	190.0000	0.0409	750.0000 0.4103
CONCENTRATION AT SOURCE..... = 1 [mg/l]	200.0000	0.0527	760.0000 0.4037
INITIAL TIME..... = 0 [y]	210.0000	0.0661	770.0000 0.3972
LENGTH OF TIME STEP..... = 10 [y]	220.0000	0.0810	780.0000 0.3905
NUMBER OF TIME STEPS..... = 80	230.0000	0.0972	790.0000 0.3839
NUMBER OF OBSERVATION POINTS.. = 1	240.0000	0.1148	800.0000 0.3772
1 DISTANCE (from source). = 6.83 [m]	250.0000	0.1332	
DURATION OF SOLUTE PULSE..... = 100000000 [y]	260.0000	0.1523	
HALF-LIFE (0 if no decay)..... = 0 [y]	270.0000	0.1719	
DECAY CONSTANT (lambda)..... = .00000+00 [1/y]	280.0000	0.1920	
HALF-LIFE at Source..... = 274.6 [y]	290.0000	0.2122	
DECAY CONSTANT (alpha)..... = .25240-02 [1/y]	300.0000	0.2323	
	310.0000	0.2524	
	320.0000	0.2720	
	330.0000	0.2913	
	340.0000	0.3099	
	350.0000	0.3279	
	360.0000	0.3451	
	370.0000	0.3615	
	380.0000	0.3769	
	390.0000	0.3915	
	400.0000	0.4050	
	410.0000	0.4176	
	420.0000	0.4292	
	430.0000	0.4398	
	440.0000	0.4493	
	450.0000	0.4579	
	460.0000	0.4655	
	470.0000	0.4721	
	480.0000	0.4779	
	490.0000	0.4827	
	500.0000	0.4867	
	510.0000	0.4898	
	520.0000	0.4922	
	530.0000	0.4938	
	540.0000	0.4947	
	550.0000	0.4949	
	560.0000	0.4945	

		CONCENTRATION C [mg/l]		
*	ONED	TIME [y]	1 DISTANCE 6.83 [m]	
*	INTERNATIONAL GROUND WATER MODELING CENTER			
*	Golden, Colorado, USA - Delft, The Netherlands			
*	SOLUTE version 2.03			
*	ANALYTICAL MODELS FOR SOLUTE TRANSPORT			
*****	*****			
PROJECT.....	= SL12DB.INP	50.0000	0.0000	2850.0000 0.4602
USER NAME.....	= ASIERRA	100.0000	0.0000	2900.0000 0.4540
DATE.....	= 06-03-1993	150.0000	0.0000	2950.0000 0.4475
DATA FILE.....	= C:\OLIN\SL12DB.INP	200.0000	0.0000	3000.0000 0.4408
INPUT DATA:		250.0000	0.0000	3050.0000 0.4338
GROUNDWATER (SEEPAGE) VELOCITY =	.2339 [m/y]	300.0000	0.0000	3100.0000 0.4266
LONGITUDINAL DISPERSIVITY....	= .68 [m]	350.0000	0.0000	3150.0000 0.4193
RETARDATION FACTOR.....	= 56.68	400.0000	0.0002	3200.0000 0.4118
INITIAL CONCENTRATION.....	= 0 [mg/l]	450.0000	0.0005	3250.0000 0.4042
CONCENTRATION AT SOURCE.....	= 1 [mg/l]	500.0000	0.0015	3300.0000 0.3965
INITIAL TIME.....	= 0 [y]	550.0000	0.0032	3350.0000 0.3888
LENGTH OF TIME STEP.....	= 50 [y]	600.0000	0.0063	3400.0000 0.3810
NUMBER OF TIME STEPS.....	= 80	650.0000	0.0110	3450.0000 0.3732
NUMBER OF OBSERVATION POINTS..	= :	700.0000	0.0176	3500.0000 0.3653
1 DISTANCE (from source). =	6.83 [m]	750.0000	0.0264	3550.0000 0.3575
DURATION OF SOLUTE PULSE.....	= 100000000 [y]	800.0000	0.0375	3600.0000 0.3497
HALF-LIFE (0 if no decay)....	= 0 [y]	850.0000	0.0509	3650.0000 0.3420
DECAY CONSTANT (lambda).....	= .00000+00 [1/y]	900.0000	0.0664	3700.0000 0.3343
HALF-LIFE at Source.....	= 1175.3 [y]	950.0000	0.0840	3750.0000 0.3266
DECAY CONSTANT (alpha).....	= .58980-03 [1/y]	1000.0000	0.1033	3800.0000 0.3190
		1050.0000	0.1244	3850.0000 0.3115
		1100.0000	0.1464	3900.0000 0.3041
		1150.0000	0.1692	3950.0000 0.2968
		1200.0000	0.1926	4000.0000 0.2896
		1250.0000	0.2162	
		1300.0000	0.2397	
		1350.0000	0.2629	
		1400.0000	0.2856	
		1450.0000	0.3075	
		1500.0000	0.3286	
		1550.0000	0.3485	
		1600.0000	0.3674	
		1650.0000	0.3849	
		1700.0000	0.4012	
		1750.0000	0.4161	
		1800.0000	0.4297	
		1850.0000	0.4419	
		1900.0000	0.4527	
		1950.0000	0.4622	
		2000.0000	0.4703	
		2050.0000	0.4772	
		2100.0000	0.4829	
		2150.0000	0.4874	
		2200.0000	0.4908	
		2250.0000	0.4931	
		2300.0000	0.4945	
		2350.0000	0.4949	
		2400.0000	0.4944	
		2450.0000	0.4931	
		2500.0000	0.4911	
		2550.0000	0.4883	
		2600.0000	0.4849	
		2650.0000	0.4809	
		2700.0000	0.4764	
		2750.0000	0.4714	
		2800.0000	0.4660	

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		CONCENTRATION C [mg/l]		
*	ONED	*		
*		*		
*	INTERNATIONAL GROUND WATER MODELING CENTER	*	TIME	1 DISTANCE
*	Golden, Colorado, USA - Delft, The Netherlands	*	[y]	6.83 [m]
*		*		
*	SOLUTE version 2.03	*	30.0000	0.0000
*		*	60.0000	0.0000
*	ANALYTICAL MODELS FOR SOLUTE TRANSPORT	*	90.0000	0.0000
*		*	120.0000	0.0000
*		*	150.0000	0.0000
*		*	180.0000	0.0000
*		*	210.0000	0.0000
*		*	240.0000	0.0000
*		*	270.0000	0.0000
PROJECT.....	= SL13DB.INP		300.0000	0.0001
USER NAME.....	= ASIERRA		330.0000	0.0004
DATE.....	= 06-02-1993		360.0000	0.0010
DATA FILE.....	= C:\OLIN\SL13DB.INP		390.0000	0.0019
			420.0000	0.0035
			450.0000	0.0060
			480.0000	0.0095
			510.0000	0.0141
			540.0000	0.0200
			570.0000	0.0274
			600.0000	0.0362
			630.0000	0.0464
			660.0000	0.0581
			690.0000	0.0711
			720.0000	0.0853
			750.0000	0.1006
			780.0000	0.1172
			810.0000	0.1342
			840.0000	0.1520
			870.0000	0.1702
			900.0000	0.1888
			930.0000	0.2075
			960.0000	0.2262
			990.0000	0.2449
			1020.0000	0.2633
			1050.0000	0.2814
			1080.0000	0.2990
			1110.0000	0.3161
			1140.0000	0.3325
			1170.0000	0.3483
			1200.0000	0.3634
			1230.0000	0.3777
			1260.0000	0.3912
			1290.0000	0.4038
			1320.0000	0.4156
			1350.0000	0.4265
			1380.0000	0.4366
			1410.0000	0.4458
			1440.0000	0.4541
			1470.0000	0.4616
			1500.0000	0.4683
			1530.0000	0.4741
			1560.0000	0.4792
			1590.0000	0.4835
			1620.0000	0.4871
			1650.0000	0.4899
			1680.0000	0.4921

CONCENTRATION C [mg/l]

		TIME [y]	1 DISTANCE 6.83 [m]	
*	ONED	*		
*		*		
*	INTERNATIONAL GROUND WATER MODELING CENTER	*		
*	Golden, Colorado, USA - Delft, The Netherlands	*		
*		*		
*	SOLUTE version 2.03	*		
*		*		
*	ANALYTICAL MODELS FOR SOLUTE TRANSPORT	*		
*		*		
*****	*****	100.0000	0.0000	1220.0000 0.4945
		120.0000	0.0000	1240.0000 0.4936
		140.0000	0.0000	1260.0000 0.4923
		160.0000	0.0000	1280.0000 0.4905
		180.0000	0.0000	1300.0000 0.4883
PROJECT..... =	SL14DB.INP	200.0000	0.0001	1320.0000 0.4857
USER NAME.... =	ASIERRA	220.0000	0.0004	1340.0000 0.4827
DATE..... =	06-03-1993	240.0000	0.0008	1360.0000 0.4794
DATA FILE.... =	C:\OLIN\SL14DB.INP	260.0000	0.0017	1380.0000 0.4758
		280.0000	0.0032	1400.0000 0.4719
		300.0000	0.0055	1420.0000 0.4677
		320.0000	0.0087	1440.0000 0.4632
		340.0000	0.0130	1460.0000 0.4585
		360.0000	0.0186	1480.0000 0.4537
		380.0000	0.0255	1500.0000 0.4486
GROUNDWATER (SEEPAGE) VELOCITY =	.2339 [m/y]	400.0000	0.0338	1520.0000 0.4434
LONGITUDINAL DISPERSIVITY.... =	.68 [m]	420.0000	0.0436	1540.0000 0.4380
RETARDATION FACTOR..... =	28.9	440.0000	0.0547	1560.0000 0.4324
INITIAL CONCENTRATION..... =	0 [mg/l]	460.0000	0.0671	1580.0000 0.4268
CONCENTRATION AT SOURCE..... =	1 [mg/l]	480.0000	0.0808	1600.0000 0.4210
INITIAL TIME..... =	0 [y]	500.0000	0.0956	
LENGTH OF TIME STEP..... =	20 [y]	520.0000	0.1117	
NUMBER OF TIME STEPS..... =	80	540.0000	0.1283	
NUMBER OF OBSERVATION POINTS.. =	1	560.0000	0.1456	
1 DISTANCE (from source). =	6.83 [m]	580.0000	0.1635	
DURATION OF SOLUTE PULSE..... =	100000000 [y]	600.0000	0.1817	
HALF-LIFE (0 if no decay).... =	0 [y]	620.0000	0.2001	
DECAY CONSTANT (lambda)..... =	.00000+00 [1/y]	640.0000	0.2186	
HALF-LIFE at Source..... =	599.2 [y]	660.0000	0.2371	
DECAY CONSTANT (alpha)..... =	.1157D-02 [1/y]	680.0000	0.2554	
		700.0000	0.2734	
		720.0000	0.2910	
		740.0000	0.3081	
		760.0000	0.3247	
		780.0000	0.3406	
		800.0000	0.3558	
		820.0000	0.3703	
		840.0000	0.3841	
		860.0000	0.3970	
		880.0000	0.4091	
		900.0000	0.4204	
		920.0000	0.4308	
		940.0000	0.4404	
		960.0000	0.4491	
		980.0000	0.4570	
		1000.0000	0.4641	
		1020.0000	0.4704	
		1040.0000	0.4759	
		1060.0000	0.4807	
		1080.0000	0.4847	
		1100.0000	0.4880	
		1120.0000	0.4906	

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CONCENTRATION C [mg/l]

ONED		TIME [y]	1 DISTANCE 6.83 [m]	C [mg/l]
*	*			
*	INTERNATIONAL GROUND WATER MODELING CENTER			
*	Golden, Colorado, USA - Delft, The Netherlands			
*	*			
*	SOLUTE version 2.03			
*	*			
*	ANALYTICAL MODELS FOR SOLUTE TRANSPORT			
*	*			
PROJECT.....	= SL124B.INP	180.0000	0.0000	10260.0000 0.4400
USER NAME....	= ASIERRA	360.0000	0.0000	10440.0000 0.4473
DATE.....	= 06-03-1993	540.0000	0.0000	10620.0000 0.4540
DATA FILE....	= C:\OLIN\SL124B.INP	720.0000	0.0000	10800.0000 0.4601
		900.0000	0.0000	10980.0000 0.4658
		1080.0000	0.0000	11160.0000 0.4708
		1260.0000	0.0000	11340.0000 0.4754
		1440.0000	0.0000	11520.0000 0.4794
		1620.0000	0.0000	11700.0000 0.4829
		1800.0000	0.0000	11880.0000 0.4860
		1980.0000	0.0000	12060.0000 0.4886
		2160.0000	0.0001	12240.0000 0.4907
		2340.0000	0.0003	12420.0000 0.4923
		2520.0000	0.0006	12600.0000 0.4936
		2700.0000	0.0011	12780.0000 0.4944
		2880.0000	0.0020	12960.0000 0.4948
		3060.0000	0.0032	13140.0000 0.4949
		3240.0000	0.0050	13320.0000 0.4945
		3420.0000	0.0074	13500.0000 0.4939
		3600.0000	0.0106	13680.0000 0.4929
		3780.0000	0.0145	13860.0000 0.4916
		3960.0000	0.0193	14040.0000 0.4900
		4140.0000	0.0251	14220.0000 0.4881
		4320.0000	0.0318	14400.0000 0.4860
		4500.0000	0.0394	
		4680.0000	0.0481	
		4860.0000	0.0576	
		5040.0000	0.0680	
		5220.0000	0.0792	
		5400.0000	0.0913	
		5580.0000	0.1040	
		5760.0000	0.1176	
		5940.0000	0.1315	
		6120.0000	0.1458	
		6300.0000	0.1604	
		6480.0000	0.1754	
		6660.0000	0.1905	
		6840.0000	0.2057	
		7020.0000	0.2210	
		7200.0000	0.2362	
		7380.0000	0.2513	
		7560.0000	0.2662	
		7740.0000	0.2809	
		7920.0000	0.2953	
		8100.0000	0.3093	
		8280.0000	0.3229	
		8460.0000	0.3362	
		8640.0000	0.3499	
		8820.0000	0.3612	
		9000.0000	0.3730	
		9180.0000	0.3842	
		9360.0000	0.3949	
		9540.0000	0.4051	
		9720.0000	0.4147	
		9900.0000	0.4237	
		10080.0000	0.4321	

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CONCENTRATION C [mg/l]

*****		TIME [y]	1 DISTANCE 6.83 [m]	
*	ONED	*		
*		*		
*	INTERNATIONAL GROUND WATER MODELING CENTER	*		
*	Golden, Colorado, USA - Delft, The Netherlands	*		
*		*		
*	SOLUTE version 2.03	*		
*		*		
*	ANALYTICAL MODELS FOR SOLUTE TRANSPORT	*		
*		*		
*****	*****	*****	*****	*****
PROJECT.....	= SLMERB.INP	480.0000	0.0000	X27360.0000 0.4926
USER NAME.....	= ASIERRA	960.0000	0.0000	X27840.0000 0.4939
DATE.....	= 06-03-1993	1440.0000	0.0000	X28320.0000 0.4947
DATA FILE.....	= C:\OLIN\SLMERB.INP	1920.0000	0.0000	X28800.0000 0.4949
		2400.0000	0.0000	X29280.0000 0.4945
		2880.0000	0.0000	X29760.0000 0.4937
		3360.0000	0.0000	X30240.0000 0.4923
		3840.0000	0.0000	X30720.0000 0.4905
		4320.0000	0.0000	X31200.0000 0.4883
		4800.0000	0.0001	X31680.0000 0.4857
		5280.0000	0.0004	X32160.0000 0.4827
		5760.0000	0.0008	X32640.0000 0.4794
		6240.0000	0.0017	X33120.0000 0.4758
		6720.0000	0.0032	X33600.0000 0.4719
		7200.0000	0.0055	X34080.0000 0.4677
		7680.0000	0.0087	X34560.0000 0.4632
	INPUT DATA:	8160.0000	0.0130	X35040.0000 0.4585
		8640.0000	0.0186	X35520.0000 0.4537
		9120.0000	0.0255	X36000.0000 0.4486
		9600.0000	0.0338	X36480.0000 0.4434
	GROUNDWATER (SEEPAGE) VELOCITY	= .2339 [m/y]		X10080.0000 0.0436
	LONGITUDINAL DISPERSIVITY.....	= .68 [m]		X10560.0000 0.0547
	RETARDATION FACTOR.....	= 693.5599999999999		X11040.0000 0.0672
	INITIAL CONCENTRATION.....	= 0 [mg/l]		X11520.0000 0.0808
	CONCENTRATION AT SOURCE.....	= 1 [mg/l]		X12000.0000 0.0956
	INITIAL TIME.....	= 0 [y]		X12480.0000 0.1117
	LENGTH OF TIME STEP.....	= 480 [y]		X12960.0000 0.1283
	NUMBER OF TIME STEPS.....	= 80		X13440.0000 0.1456
	NUMBER OF OBSERVATION POINTS..	= 1		X13920.0000 0.1635
	1 DISTANCE (from source)	= 6.83 [m]		X14400.0000 0.1817
	DURATION OF SOLUTE PULSE.....	= 100000000 [y]		X14880.0000 0.2001
	HALF-LIFE (0 if no decay).....	= 0 [y]		X15360.0000 0.2187
	DECAY CONSTANT (lambda).....	= .00000+00 [1/y]		X15840.0000 0.2371
	HALF-LIFE at Source.....	= 14381.1 [y]		X16320.0000 0.2554
	DECAY CONSTANT (alpha).....	= .48200-04 [1/y]		X16800.0000 0.2734
				X17280.0000 0.2910
				X17760.0000 0.3081
				X18240.0000 0.3247
				X18720.0000 0.3406
				X19200.0000 0.3559
				X19680.0000 0.3704
				X20160.0000 0.3841
				X20640.0000 0.3970
				X21120.0000 0.4091
				X21600.0000 0.4204
				X22080.0000 0.4308
				X22560.0000 0.4404
				X23040.0000 0.4491
				X23520.0000 0.4570
				X24000.0000 0.4641
				X24480.0000 0.4704
				X24960.0000 0.4759
				X25440.0000 0.4807
				X25920.0000 0.4847
				X26400.0000 0.4880
				X26880.0000 0.4906

Woodward-Clyde

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OLD PLANT (CPC) LANDFILL AREA

**SOLUTE RUNS
WITH DECAY**

CONCENTRATION C [mg/l]

		TIME [y]	1 DISTANCE 6.83 [m]	
*	ONED			
*				
*	INTERNATIONAL GROUND WATER MODELING CENTER			
*	Golden, Colorado, USA - Delft, The Netherlands			
*				
*	SOLUTE version 2.03			
*				
*	ANALYTICAL MODELS FOR SOLUTE TRANSPORT			
*				
*****	*****			
		4.0000	0.0000	
		8.0000	0.0000	228.0000 0.0000
		12.0000	0.0000	232.0000 0.0000
		16.0000	0.0000	236.0000 0.0000
		20.0000	0.0000	240.0000 0.0000
		24.0000	0.0000	244.0000 0.0000
		28.0000	0.0000	248.0000 0.0000
		32.0000	0.0000	252.0000 0.0000
		36.0000	0.0000	256.0000 0.0000
PROJECT.....	= SLBEN1.INP	40.0000	0.0000	260.0000 0.0000
USER NAME.....	= ASIERRA	44.0000	0.0000	264.0000 0.0000
DATE.....	= 06-03-1993	48.0000	0.0000	268.0000 0.0000
DATA FILE.....	= C:\OLIN\SLBEN1.INP	52.0000	0.0000	272.0000 0.0000
		56.0000	0.0000	276.0000 0.0000
		60.0000	0.0000	280.0000 0.0000
		64.0000	0.0000	284.0000 0.0000
INPUT DATA:		68.0000	0.0000	288.0000 0.0000
		72.0000	0.0000	292.0000 0.0000
		76.0000	0.0000	296.0000 0.0000
GROUNDWATER (SEEPAGE) VELOCITY =	.2339 [m/y]	80.0000	0.0000	300.0000 0.0000
LONGITUDINAL DISPERSIVITY....	= .68 [m]	84.0000	0.0000	304.0000 0.0000
RETARDATION FACTOR.....	= 5.69	88.0000	0.0000	308.0000 0.0000
INITIAL CONCENTRATION.....	= 0 [mg/l]	92.0000	0.0000	312.0000 0.0000
CONCENTRATION AT SOURCE.....	= 1 [mg/l]	96.0000	0.0000	316.0000 0.0000
INITIAL TIME.....	= 0 [y]	100.0000	0.0000	320.0000 0.0000
LENGTH OF TIME STEP.....	= 4 [y]	104.0000	0.0000	
NUMBER OF TIME STEPS.....	= 80	108.0000	0.0000	
NUMBER OF OBSERVATION POINTS..	= 1	112.0000	0.0000	
1 DISTANCE (from source). =	6.83 [m]	116.0000	0.0000	
DURATION OF SOLUTE PULSE.....	= 100000000 [y]	120.0000	0.0000	
HALF-LIFE (0 if no decay)....	= 2.2 [y]	124.0000	0.0000	
DECAY CONSTANT (lambda).....	= .3151D+00 [1/y]	128.0000	0.0000	
HALF-LIFE at Source.....	= 117.9 [y]	132.0000	0.0000	
DECAY CONSTANT (alpha).....	= .5879D-02 [1/y]	136.0000	0.0000	
		140.0000	0.0000	
		144.0000	0.0000	
		148.0000	0.0000	
		152.0000	0.0000	
		156.0000	0.0000	
		160.0000	0.0000	
		164.0000	0.0000	
		168.0000	0.0000	
		172.0000	0.0000	
		176.0000	0.0000	
		180.0000	0.0000	
		184.0000	0.0000	
		188.0000	0.0000	
		192.0000	0.0000	
		196.0000	0.0000	
		200.0000	0.0000	
		204.0000	0.0000	
		208.0000	0.0000	
		212.0000	0.0000	
		216.0000	0.0000	
		220.0000	0.0000	
		224.0000	0.0000	

		CONCENTRATION C [mg/l]		
*	ONED	*	TIME	1 DISTANCE
*		*	[y]	6.83 [m]
*	INTERNATIONAL GROUND WATER MODELING CENTER	*	6.0000	0.0000
*	Golden, Colorado, USA - Delft, The Netherlands	*	12.0000	0.0000
*	SOLUTE version 2.03	*	18.0000	0.0000
*	ANALYTICAL MODELS FOR SOLUTE TRANSPORT	*	24.0000	0.0000
*		*	30.0000	0.0000
			36.0000	0.0000
			42.0000	0.0000
			48.0000	0.0000
			54.0000	0.0000
			60.0000	0.0000
			66.0000	0.0000
			72.0000	0.0000
			78.0000	0.0000
			84.0000	0.0000
			90.0000	0.0000
			96.0000	0.0000
			102.0000	0.0000
			108.0000	0.0000
	INPUT DATA:		114.0000	0.0000
			120.0000	0.0000
			126.0000	0.0001
			132.0000	0.0001
			138.0000	0.0001
			144.0000	0.0001
			150.0000	0.0001
			156.0000	0.0001
			162.0000	0.0002
			168.0000	0.0002
			174.0000	0.0002
			180.0000	0.0002
			186.0000	0.0002
			192.0000	0.0002
			198.0000	0.0002
			204.0000	0.0002
			210.0000	0.0002
			216.0000	0.0002
			222.0000	0.0002
			228.0000	0.0002
			234.0000	0.0002
			240.0000	0.0002
			246.0000	0.0002
			252.0000	0.0002
			258.0000	0.0002
			264.0000	0.0002
			270.0000	0.0002
			276.0000	0.0002
			282.0000	0.0002
			288.0000	0.0002
			294.0000	0.0002
			300.0000	0.0002
			306.0000	0.0002
			312.0000	0.0002
			318.0000	0.0002
			324.0000	0.0002
			330.0000	0.0002
			336.0000	0.0002

CONCENTRATION C [mg/l]

*****		TIME [y]	1 DISTANCE	C [mg/l]
*	ONED			
*				
*	INTERNATIONAL GROUND WATER MODELING CENTER			
*	Golden, Colorado, USA - Delft, The Netherlands			
*				
*	SOLUTE version 2.03			
*				
*	ANALYTICAL MODELS FOR SOLUTE TRANSPORT			
*				

		4.0000	0.0000	228.0000 0.0000
		8.0000	0.0000	232.0000 0.0000
		12.0000	0.0000	236.0000 0.0000
		16.0000	0.0000	240.0000 0.0000
		20.0000	0.0000	244.0000 0.0000
		24.0000	0.0000	248.0000 0.0000
		28.0000	0.0000	252.0000 0.0000
		32.0000	0.0000	256.0000 0.0000
		36.0000	0.0000	260.0000 0.0000
PROJECT.....	= SL12D1.INP	40.0000	0.0000	264.0000 0.0000
USER NAME....	= ASIERRA	44.0000	0.0000	268.0000 0.0000
DATE.....	= 06-03-1993	48.0000	0.0000	272.0000 0.0000
DATA FILE.....	= C:\OLIN\SL12D1.INP	52.0000	0.0000	276.0000 0.0000
		56.0000	0.0000	280.0000 0.0000
		60.0000	0.0000	284.0000 0.0000
		64.0000	0.0000	288.0000 0.0000
INPUT DATA:		68.0000	0.0000	292.0000 0.0000
		72.0000	0.0000	296.0000 0.0000
		76.0000	0.0000	300.0000 0.0000
GROUNDWATER (SEEPAGE) VELOCITY =	.2339 [m/y]	80.0000	0.0000	304.0000 0.0000
LONGITUDINAL DISPERSIVITY....	= .68 [m]	84.0000	0.0000	308.0000 0.0000
RETARDATION FACTOR.....	= 56.68	88.0000	0.0000	312.0000 0.0000
INITIAL CONCENTRATION.....	= 0 [mg/l]	92.0000	0.0000	316.0000 0.0000
CONCENTRATION AT SOURCE.....	= 1 [mg/l]	96.0000	0.0000	320.0000 0.0000
INITIAL TIME.....	= 0 [y]	100.0000	0.0000	
LENGTH OF TIME STEP.....	= 4 [y]	104.0000	0.0000	
NUMBER OF TIME STEPS.....	= 80	108.0000	0.0000	
NUMBER OF OBSERVATION POINTS..	= 1	112.0000	0.0000	
1 DISTANCE (from source).=	6.83 [m]	116.0000	0.0000	
DURATION OF SOLUTE PULSE.....	= 100000000 [y]	120.0000	0.0000	
HALF-LIFE (0 if no decay)....	= 24.7 [y]	124.0000	0.0000	
DECAY CONSTANT (lambda).....	= .28060-01 [1/y]	128.0000	0.0000	
HALF-LIFE at Source.....	= 1175.3 [y]	132.0000	0.0000	
DECAY CONSTANT (alpha).....	= .58980-03 [1/y]	136.0000	0.0000	
		140.0000	0.0000	
		144.0000	0.0000	
		148.0000	0.0000	
		152.0000	0.0000	
		156.0000	0.0000	
		160.0000	0.0000	
		164.0000	0.0000	
		168.0000	0.0000	
		172.0000	0.0000	
		176.0000	0.0000	
		180.0000	0.0000	
		184.0000	0.0000	
		188.0000	0.0000	
		192.0000	0.0000	
		196.0000	0.0000	
		200.0000	0.0000	
		204.0000	0.0000	
		208.0000	0.0000	
		212.0000	0.0000	
		216.0000	0.0000	
		220.0000	0.0000	
		224.0000	0.0000	

CONCENTRATION C [mg/l]

ONED	TIME [y]	1 DISTANCE 6.83 [m]	C [mg/l]
INTERNATIONAL GROUND WATER MODELING CENTER Golden, Colorado, USA - Delft, The Netherlands	5.0000	0.0000	285.0000 0.0000
SOLUTE version 2.03	10.0000	0.0000	290.0000 0.0000
ANALYTICAL MODELS FOR SOLUTE TRANSPORT	15.0000	0.0000	295.0000 0.0000
	20.0000	0.0000	300.0000 0.0000
	25.0000	0.0000	305.0000 0.0000
	30.0000	0.0000	310.0000 0.0000
	35.0000	0.0000	315.0000 0.0000
	40.0000	0.0000	320.0000 0.0000
	45.0000	0.0000	325.0000 0.0000
PROJECT..... = SL13D1.INP	50.0000	0.0000	330.0000 0.0000
USER NAME.... = ASTERRA	55.0000	0.0000	335.0000 0.0000
DATE..... = 06-02-1993	60.0000	0.0000	340.0000 0.0000
DATA FILE.... = C:\OLIN\SL13D1.INP	65.0000	0.0000	345.0000 0.0000
	70.0000	0.0000	350.0000 0.0000
	75.0000	0.0000	355.0000 0.0000
	80.0000	0.0000	360.0000 0.0000
INPUT DATA:	85.0000	0.0000	365.0000 0.0000
	90.0000	0.0000	370.0000 0.0000
	95.0000	0.0000	375.0000 0.0000
GROUNDWATER (SEEPAGE) VELOCITY = .2339 [m/y]	100.0000	0.0000	380.0000 0.0000
LONGITUDINAL DISPERSIVITY.... = .68 [m]	105.0000	0.0000	385.0000 0.0000
RETARDATION FACTOR..... = 42.8	110.0000	0.0000	390.0000 0.0000
INITIAL CONCENTRATION..... = 0 [mg/l]	115.0000	0.0000	395.0000 0.0000
CONCENTRATION AT SOURCE..... = 1 [mg/l]	120.0000	0.0000	400.0000 0.0000
INITIAL TIME..... = 0 [y]	125.0000	0.0000	
LENGTH OF TIME STEP..... = 5 [y]	130.0000	0.0000	
NUMBER OF TIME STEPS..... = 80	135.0000	0.0000	
NUMBER OF OBSERVATION POINTS.. = 1	140.0000	0.0000	
1 DISTANCE (from source). = 6.83 [m]	145.0000	0.0000	
DURATION OF SOLUTE PULSE..... = 100000000 [y]	150.0000	0.0000	
HALF-LIFE (0 if no decay).... = 24.7 [y]	155.0000	0.0000	
DECAY CONSTANT (lambda)..... = .28060-01 [1/y]	160.0000	0.0000	
HALF-LIFE at Source..... = 887.5 [y]	165.0000	0.0000	
DECAY CONSTANT (alpha)..... = .78100-03 [1/y]	170.0000	0.0000	
	175.0000	0.0000	
	180.0000	0.0000	
	185.0000	0.0000	
	190.0000	0.0000	
	195.0000	0.0000	
	200.0000	0.0000	
	205.0000	0.0000	
	210.0000	0.0000	
	215.0000	0.0000	
	220.0000	0.0000	
	225.0000	0.0000	
	230.0000	0.0000	
	235.0000	0.0000	
	240.0000	0.0000	
	245.0000	0.0000	
	250.0000	0.0000	
	255.0000	0.0000	
	260.0000	0.0000	
	265.0000	0.0000	
	270.0000	0.0000	
	275.0000	0.0000	
	280.0000	0.0000	

CONCENTRATION C [mg/l]

ONED	TIME [y]	1 DISTANCE [m]	C [mg/l]
INTERNATIONAL GROUND WATER MODELING CENTER	5.0000	0.0000	285.0000 0.0000
Golden, Colorado, USA - Delft, The Netherlands	10.0000	0.0000	290.0000 0.0000
SOLUTE version 2.03	15.0000	0.0000	295.0000 0.0000
ANALYTICAL MODELS FOR SOLUTE TRANSPORT	20.0000	0.0000	300.0000 0.0000
	25.0000	0.0000	305.0000 0.0000
	30.0000	0.0000	310.0000 0.0000
	35.0000	0.0000	315.0000 0.0000
	40.0000	0.0000	320.0000 0.0000
	45.0000	0.0000	325.0000 0.0000
PROJECT..... = SL1401.INP	50.0000	0.0000	330.0000 0.0000
USER NAME..... = ASTIERRA	55.0000	0.0000	335.0000 0.0000
DATE..... = 06-03-1993	60.0000	0.0000	340.0000 0.0000
DATA FILE..... = C:\OLIN\SL1401.INP	65.0000	0.0000	345.0000 0.0000
	70.0000	0.0000	350.0000 0.0000
	75.0000	0.0000	355.0000 0.0000
	80.0000	0.0000	360.0000 0.0000
INPUT DATA:	85.0000	0.0000	365.0000 0.0000
	90.0000	0.0000	370.0000 0.0000
	95.0000	0.0000	375.0000 0.0000
GROUNDWATER (SEEPAGE) VELOCITY = .2339 [m/y]	100.0000	0.0000	380.0000 0.0000
LONGITUDINAL DISPERSIVITY.... = .68 [m]	105.0000	0.0000	385.0000 0.0000
RETARDATION FACTOR..... = 28.9	110.0000	0.0000	390.0000 0.0000
INITIAL CONCENTRATION..... = 0 [mg/l]	115.0000	0.0000	395.0000 0.0000
CONCENTRATION AT SOURCE..... = 1 [mg/l]	120.0000	0.0000	400.0000 0.0000
INITIAL TIME..... = 0 [y]	125.0000	0.0000	
LENGTH OF TIME STEP..... = 5 [y]	130.0000	0.0000	
NUMBER OF TIME STEPS..... = 80	135.0000	0.0000	
NUMBER OF OBSERVATION POINTS.. = 1	140.0000	0.0000	
1 DISTANCE (from source).. = 6.83 [m]	145.0000	0.0000	
DURATION OF SOLUTE PULSE..... = 100000000 [y]	150.0000	0.0000	
HALF-LIFE (0 if no decay).... = 24.7 [y]	155.0000	0.0000	
DECAY CONSTANT (lambda)..... = .28060-01 [1/y]	160.0000	0.0000	
HALF-LIFE at Source..... = 599.2 [y]	165.0000	0.0000	
DECAY CONSTANT (alpha)..... = .11570-02 [1/y]	170.0000	0.0000	
	175.0000	0.0000	
	180.0000	0.0000	
	185.0000	0.0000	
	190.0000	0.0000	
	195.0000	0.0000	
	200.0000	0.0000	
	205.0000	0.0000	
	210.0000	0.0000	
	215.0000	0.0000	
	220.0000	0.0000	
	225.0000	0.0000	
	230.0000	0.0000	
	235.0000	0.0000	
	240.0000	0.0000	
	245.0000	0.0000	
	250.0000	0.0000	
	255.0000	0.0000	
	260.0000	0.0000	
	265.0000	0.0000	
	270.0000	0.0000	
	275.0000	0.0000	
	280.0000	0.0000	

3 8 1605

ONED-3

PAGE 1

CONCENTRATION C [mg/l]

*	ONED	*	TIME [y]	1 DISTANCE 6.83 [m]	
*	INTERNATIONAL GROUND WATER MODELING CENTER	*	5.0000	0.0000	285.0000 0.0000
*	Golden, Colorado, USA - Delft, The Netherlands	*	10.0000	0.0000	290.0000 0.0000
*	SOLUTE version 2.03	*	15.0000	0.0000	295.0000 0.0000
*	ANALYTICAL MODELS FOR SOLUTE TRANSPORT	*	20.0000	0.0000	300.0000 0.0000
*		*	25.0000	0.0000	305.0000 0.0000
*		*	30.0000	0.0000	310.0000 0.0000
*		*	35.0000	0.0000	315.0000 0.0000
*		*	40.0000	0.0000	320.0000 0.0000
*		*	45.0000	0.0000	325.0000 0.0000
*		*	50.0000	0.0000	330.0000 0.0000
PROJECT..... = SL1241.INP		*	55.0000	0.0000	335.0000 0.0000
USER NAME.... = ASIERRA		*	60.0000	0.0000	340.0000 0.0000
DATE..... = 06-03-1993		*	65.0000	0.0000	345.0000 0.0000
DATA FILE..... = C:\OLIN\SL1241.INP		*	70.0000	0.0000	350.0000 0.0000
		*	75.0000	0.0000	355.0000 0.0000
		*	80.0000	0.0000	360.0000 0.0000
	INPUT DATA:	*	85.0000	0.0000	365.0000 0.0000
		*	90.0000	0.0000	370.0000 0.0000
		*	95.0000	0.0000	375.0000 0.0000
GROUNDWATER (SEEPAGE) VELOCITY = .2339 [m/y]		*	100.0000	0.0000	380.0000 0.0000
LONGITUDINAL DISPERSIVITY.... = .68 [m]		*	105.0000	0.0000	385.0000 0.0000
RETARDATION FACTOR..... = 315.74		*	110.0000	0.0000	390.0000 0.0000
INITIAL CONCENTRATION..... = 0 [mg/l]		*	115.0000	0.0000	395.0000 0.0000
CONCENTRATION AT SOURCE..... = 1 [mg/l]		*	120.0000	0.0000	400.0000 0.0000
INITIAL TIME..... = 0 [y]		*	125.0000	0.0000	
LENGTH OF TIME STEP..... = 5 [y]		*	130.0000	0.0000	
NUMBER OF TIME STEPS..... = 80		*	135.0000	0.0000	
NUMBER OF OBSERVATION POINTS.. = 1		*	140.0000	0.0000	
1 DISTANCE (from source).. = 6.83 [m]		*	145.0000	0.0000	
DURATION OF SOLUTE PULSE..... = 100000000 [y]		*	150.0000	0.0000	
HALF-LIFE (0 if no decay).... = 24.7 [y]		*	155.0000	0.0000	
DECAY CONSTANT (lambda)..... = .2806D-01 [1/y]		*	160.0000	0.0000	
HALF-LIFE at Source..... = 6547 [y]		*	165.0000	0.0000	
DECAY CONSTANT (alpha)..... = .1059D-03 [1/y]		*	170.0000	0.0000	
		*	175.0000	0.0000	
		*	180.0000	0.0000	
		*	185.0000	0.0000	
		*	190.0000	0.0000	
		*	195.0000	0.0000	
		*	200.0000	0.0000	
		*	205.0000	0.0000	
		*	210.0000	0.0000	
		*	215.0000	0.0000	
		*	220.0000	0.0000	
		*	225.0000	0.0000	
		*	230.0000	0.0000	
		*	235.0000	0.0000	
		*	240.0000	0.0000	
		*	245.0000	0.0000	
		*	250.0000	0.0000	
		*	255.0000	0.0000	
		*	260.0000	0.0000	
		*	265.0000	0.0000	
		*	270.0000	0.0000	
		*	275.0000	0.0000	
		*	280.0000	0.0000	

Woodward-Clyde

3 8 1606

FORMER CPC PLANT AREA

**SOLUTE RUNS
NO DECAY**

3 8 1607

CONCENTRATION C [mg/l]

		TIME [y]	1 DISTANCE 5.50 [m]	
*	ONED	*		
*		*		
*	INTERNATIONAL GROUND WATER MODELING CENTER	*		
*	Golden, Colorado, USA - Delft, The Netherlands	*		
*		*		
*	SOLUTE version 2.03	*		
*		*		
*	ANALYTICAL MODELS FOR SOLUTE TRANSPORT	*		
*		*		
*****	*****	*****	*****	*****
PROJECT..... = SPBENB.INP		3.0000	0.0000	171.0000 0.2629
USER NAME.... = ASIERRA		6.0000	0.0000	174.0000 0.2545
DATE..... = 06-02-1993		9.0000	0.0000	177.0000 0.2461
DATA FILE.... = C:\OLIN\SPBENB.INP		12.0000	0.0000	180.0000 0.2378
		15.0000	0.0000	183.0000 0.2295
		18.0000	0.0000	186.0000 0.2214
		21.0000	0.0001	189.0000 0.2133
		24.0000	0.0003	192.0000 0.2054
		27.0000	0.0009	195.0000 0.1977
		30.0000	0.0022	198.0000 0.1901
		33.0000	0.0047	201.0000 0.1826
		36.0000	0.0088	204.0000 0.1754
		39.0000	0.0148	207.0000 0.1683
		42.0000	0.0230	210.0000 0.1614
		45.0000	0.0335	213.0000 0.1548
		48.0000	0.0462	216.0000 0.1483
	INPUT DATA:	51.0000	0.0610	219.0000 0.1420
		54.0000	0.0777	222.0000 0.1359
		57.0000	0.0959	225.0000 0.1300
GROUNDWATER (SEEPAGE) VELOCITY = .61 [m/y]		60.0000	0.1154	228.0000 0.1244
LONGITUDINAL DISPERSIVITY.... = .55 [m]		63.0000	0.1357	231.0000 0.1189
RETARDATION FACTOR..... = 10.47		66.0000	0.1564	234.0000 0.1136
INITIAL CONCENTRATION..... = 0 [mg/l]		69.0000	0.1773	237.0000 0.1085
CONCENTRATION AT SOURCE..... = 1 [mg/l]		72.0000	0.1980	240.0000 0.1036
INITIAL TIME..... = 0 [y]		75.0000	0.2181	
LENGTH OF TIME STEP..... = 3 [y]		78.0000	0.2374	
NUMBER OF TIME STEPS..... = 80		81.0000	0.2557	
NUMBER OF OBSERVATION POINTS.. = 1		84.0000	0.2728	
1 DISTANCE (from source).. = 5.5 [m]		87.0000	0.2886	
DURATION OF SOLUTE PULSE..... = 100000000 [y]		90.0000	0.3030	
HALF-LIFE (0 if no decay).... = 0 [y]		93.0000	0.3159	
DECAY CONSTANT (lambda)..... = .0000D+00 [1/y]		96.0000	0.3272	
HALF-LIFE at Source..... = 36.7 [y]		99.0000	0.3370	
DECAY CONSTANT (alpha)..... = .1889D-01 [1/y]		102.0000	0.3452	
		105.0000	0.3520	
		108.0000	0.3573	
		111.0000	0.3611	
		114.0000	0.3637	
		117.0000	0.3650	
		120.0000	0.3651	
		123.0000	0.3641	
		126.0000	0.3620	
		129.0000	0.3591	
		132.0000	0.3553	
		135.0000	0.3508	
		138.0000	0.3456	
		141.0000	0.3397	
		144.0000	0.3334	
		147.0000	0.3266	
		150.0000	0.3194	
		153.0000	0.3119	
		156.0000	0.3041	
		159.0000	0.2961	
		162.0000	0.2879	
		165.0000	0.2797	
		168.0000	0.2713	

		CONCENTRATION C [mg/l]		
*	ONED	*	TIME	1 DISTANCE
*		*	[y]	5.50 [m]
*	INTERNATIONAL GROUND WATER MODELING CENTER	*	7.0000	0.0000
*	Golden, Colorado, USA - Delft, The Netherlands	*	14.0000	0.0000
*	SOLUTE version 2.03	*	21.0000	0.0000
*	ANALYTICAL MODELS FOR SOLUTE TRANSPORT	*	28.0000	0.0000
*		*	35.0000	0.0000
*		*	42.0000	0.0000
*		*	49.0000	0.0000
*		*	56.0000	0.0002
*		*	63.0000	0.0006
*	PROJECT..... = SPCHBB.INP	*	70.0000	0.0015
*	USER NAME..... = ASIERRA	*	77.0000	0.0033
*	DATE..... = 06-02-1993	*	84.0000	0.0064
*	DATA FILE..... = C:\OLIN\SPCHBB.INP	*	91.0000	0.0111
*		*	98.0000	0.0176
*		*	105.0000	0.0262
*	INPUT DATA:	*	112.0000	0.0368
*		*	119.0000	0.0495
*		*	126.0000	0.0640
*	GROUNDWATER (SEEPAGE) VELOCITY = .61 [m/y]	*	133.0000	0.0802
*	LONGITUDINAL DISPERSIVITY.... = .55 [m]	*	140.0000	0.0978
*	RETARDATION FACTOR..... = 25.58	*	147.0000	0.1165
*	INITIAL CONCENTRATION..... = 0 [mg/l]	*	154.0000	0.1359
*	CONCENTRATION AT SOURCE..... = 1 [mg/l]	*	161.0000	0.1557
*	INITIAL TIME..... = 0 [y]	*	168.0000	0.1756
*	LENGTH OF TIME STEP..... = 7 [y]	*	175.0000	0.1954
*	NUMBER OF TIME STEPS..... = 80	*	182.0000	0.2147
*	NUMBER OF OBSERVATION POINTS.. = 1	*	189.0000	0.2333
*	1 DISTANCE (from source). = 5.5 [m]	*	196.0000	0.2510
*	DURATION OF SOLUTE PULSE..... = 100000000 [y]	*	203.0000	0.2677
*	HALF-LIFE (0 if no decay).... = 0 [y]	*	210.0000	0.2832
*	DECAY CONSTANT (lambda)..... = .00000+00 [1/y]	*	217.0000	0.2974
*	HALF-LIFE at Source..... = 89.5999999999999 [y]	*	224.0000	0.3103
*	DECAY CONSTANT (alpha)..... = .77360-02 [1/y]	*	231.0000	0.3218
*		*	238.0000	0.3319
*		*	245.0000	0.3406
*		*	252.0000	0.3479
*		*	259.0000	0.3538
*		*	266.0000	0.3584
*		*	273.0000	0.3618
*		*	280.0000	0.3639
*		*	287.0000	0.3649
*		*	294.0000	0.3648
*		*	301.0000	0.3638
*		*	308.0000	0.3618
*		*	315.0000	0.3590
*		*	322.0000	0.3554
*		*	329.0000	0.3511
*		*	336.0000	0.3462
*		*	343.0000	0.3408
*		*	350.0000	0.3348
*		*	357.0000	0.3284
*		*	364.0000	0.3217
*		*	371.0000	0.3146
*		*	378.0000	0.3073
*		*	385.0000	0.2997
*		*	392.0000	0.2920

CONCENTRATION C [mg/l]

		TIME [y]	1 DISTANCE 5.50 [m]	
*	ONEd			
*	INTERNATIONAL GROUND WATER MODELING CENTER	25.0000	0.0000	1425.0000 0.3543
*	Golden, Colorado, USA - Delft, The Netherlands	50.0000	0.0000	1450.0000 0.3507
*	SOLUTE version 2.03	75.0000	0.0000	1475.0000 0.3468
*	ANALYTICAL MODELS FOR SOLUTE TRANSPORT	100.0000	0.0000	1500.0000 0.3424
*		125.0000	0.0000	1525.0000 0.3378
*		150.0000	0.0000	1550.0000 0.3328
*		175.0000	0.0000	1575.0000 0.3275
*		200.0000	0.0000	1600.0000 0.3220
*		225.0000	0.0001	1625.0000 0.3163
PROJECT.....	= SP12DB.INP	250.0000	0.0002	1650.0000 0.3105
USER NAME.....	= ASIERRA	275.0000	0.0005	1675.0000 0.3044
DATE.....	= 06-02-1993	300.0000	0.0012	1700.0000 0.2982
DATA FILE.....	= C:\OLIN\SP12DB.INP	325.0000	0.0024	1725.0000 0.2920
		350.0000	0.0043	1750.0000 0.2856
		375.0000	0.0071	1775.0000 0.2792
		400.0000	0.0110	1800.0000 0.2727
	INPUT DATA:	425.0000	0.0161	1825.0000 0.2662
		450.0000	0.0225	1850.0000 0.2597
		475.0000	0.0303	1875.0000 0.2532
GROUNDWATER (SEEPAGE) VELOCITY =	.61 [m/y]	500.0000	0.0395	1900.0000 0.2467
LONGITUDINAL DISPERSIVITY....	= .55 [m]	525.0000	0.0500	1925.0000 0.2402
RETARDATION FACTOR.....	= 112.59	550.0000	0.0617	1950.0000 0.2338
INITIAL CONCENTRATION.....	= 0 [mg/l]	575.0000	0.0746	1975.0000 0.2274
CONCENTRATION AT SOURCE.....	= 1 [mg/l]	600.0000	0.0884	2000.0000 0.2211
INITIAL TIME.....	= 0 [y]	625.0000	0.1030	
LENGTH OF TIME STEP.....	= 25 [y]	650.0000	0.1183	
NUMBER OF TIME STEPS.....	= 80	675.0000	0.1341	
NUMBER OF OBSERVATION POINTS..	= 1	700.0000	0.1501	
1 DISTANCE (from source). =	5.5 [m]	725.0000	0.1663	
DURATION OF SOLUTE PULSE.....	= 100000000 [y]	750.0000	0.1824	
HALF-LIFE (0 if no decay).....	= 0 [y]	775.0000	0.1984	
DECAY CONSTANT (lambda).....	= .0000D+00 [1/y]	800.0000	0.2140	
HALF-LIFE at Source.....	= 394.2 [y]	825.0000	0.2292	
DECAY CONSTANT (alpha).....	= .17580-02 [1/y]	850.0000	0.2438	
		875.0000	0.2578	
		900.0000	0.2710	
		925.0000	0.2835	
		950.0000	0.2951	
		975.0000	0.3059	
		1000.0000	0.3157	
		1025.0000	0.3246	
		1050.0000	0.3326	
		1075.0000	0.3396	
		1100.0000	0.3458	
		1125.0000	0.3510	
		1150.0000	0.3554	
		1175.0000	0.3589	
		1200.0000	0.3615	
		1225.0000	0.3634	
		1250.0000	0.3645	
		1275.0000	0.3649	
		1300.0000	0.3646	
		1325.0000	0.3637	
		1350.0000	0.3621	
		1375.0000	0.3600	
		1400.0000	0.3574	

CONCENTRATION C [mg/l]

ONED	TIME [y]	1 DISTANCE 5.50 [m]	C [mg/l]
INTERNATIONAL GROUND WATER MODELING CENTER Golden, Colorado, USA - Delft, The Netherlands			
SOLUTE version 2.03	20.0000	0.0000	1140.0000 0.3398
ANALYTICAL MODELS FOR SOLUTE TRANSPORT	40.0000	0.0000	1160.0000 0.3347
	60.0000	0.0000	1180.0000 0.3292
	80.0000	0.0000	1200.0000 0.3234
	100.0000	0.0000	1220.0000 0.3174
	120.0000	0.0000	1240.0000 0.3112
	140.0000	0.0000	1260.0000 0.3048
	160.0000	0.0000	1280.0000 0.2983
	180.0000	0.0001	1300.0000 0.2916
PROJECT..... = SP13DB.INP	200.0000	0.0004	1320.0000 0.2848
USER NAME..... = ASIERRA	220.0000	0.0009	1340.0000 0.2780
DATE..... = 06-02-1993	240.0000	0.0020	1360.0000 0.2711
DATA FILE..... = C:\OLIN\SP13DB.INP	260.0000	0.0039	1380.0000 0.2642
	280.0000	0.0067	1400.0000 0.2573
	300.0000	0.0107	1420.0000 0.2503
	320.0000	0.0161	1440.0000 0.2435
INPUT DATA:	340.0000	0.0230	1460.0000 0.2366
	360.0000	0.0314	1480.0000 0.2298
	380.0000	0.0413	1500.0000 0.2231
GROUNDWATER (SEEPAGE) VELOCITY = .61 [m/y]	400.0000	0.0528	1520.0000 0.2164
LONGITUDINAL DISPERSIVITY.... = .55 [m]	420.0000	0.0656	1540.0000 0.2099
RETARDATION FACTOR..... = 84.79000000000001	440.0000	0.0796	1560.0000 0.2034
INITIAL CONCENTRATION..... = 0 [mg/l]	460.0000	0.0946	1580.0000 0.1970
CONCENTRATION AT SOURCE..... = 1 [mg/l]	480.0000	0.1105	1600.0000 0.1908
INITIAL TIME..... = 0 [y]	500.0000	0.1270	
LENGTH OF TIME STEP..... = 20 [y]	520.0000	0.1440	
NUMBER OF TIME STEPS..... = 80	540.0000	0.1611	
NUMBER OF OBSERVATION POINTS.. = 1	560.0000	0.1783	
1 DISTANCE (from source). = 5.5 [m]	580.0000	0.1953	
DURATION OF SOLUTE PULSE..... = 100000000 [y]	600.0000	0.2120	
HALF-LIFE (0 if no decay).... = 0 [y]	620.0000	0.2281	
DECAY CONSTANT (lambda)..... = .00000+00 [1/y]	640.0000	0.2437	
HALF-LIFE at Source..... = 296.8 [y]	660.0000	0.2585	
DECAY CONSTANT (alpha)..... = .2335D-02 [1/y]	680.0000	0.2725	
	700.0000	0.2856	
	720.0000	0.2978	
	740.0000	0.3089	
	760.0000	0.3190	
	780.0000	0.3281	
	800.0000	0.3361	
	820.0000	0.3431	
	840.0000	0.3491	
	860.0000	0.3540	
	880.0000	0.3580	
	900.0000	0.3610	
	920.0000	0.3631	
	940.0000	0.3644	
	960.0000	0.3649	
	980.0000	0.3645	
	1000.0000	0.3635	
	1020.0000	0.3618	
	1040.0000	0.3594	
	1060.0000	0.3565	
	1080.0000	0.3530	
	1100.0000	0.3491	
	1120.0000	0.3447	

		CONCENTRATION C [mg/l]		
*	ONED	TIME	1 DISTANCE	
*		[y]	5.50 [m]	
*	INTERNATIONAL GROUND WATER MODELING CENTER	15.0000	0.0000	855.0000 0.3004
*	Golden, Colorado, USA - Delft, The Netherlands	30.0000	0.0000	870.0000 0.2930
*	SOLUTE version 2.03	45.0000	0.0000	885.0000 0.2855
*	ANALYTICAL MODELS FOR SOLUTE TRANSPORT	60.0000	0.0000	900.0000 0.2778
*		75.0000	0.0000	915.0000 0.2701
*		90.0000	0.0000	930.0000 0.2624
*		105.0000	0.0000	945.0000 0.2547
*		120.0000	0.0001	960.0000 0.2470
*		135.0000	0.0004	975.0000 0.2393
PROJECT.....	= SP14DB.INP	150.0000	0.0011	990.0000 0.2317
USER NAME.....	= ASIERRA	165.0000	0.0025	1005.0000 0.2241
DATE.....	= 06-02-1993	180.0000	0.0049	1020.0000 0.2167
DATA FILE.....	= C:\OLIN\SP14DB.INP	195.0000	0.0086	1035.0000 0.2094
		210.0000	0.0140	1050.0000 0.2022
		225.0000	0.0212	1065.0000 0.1951
	INPUT DATA:	240.0000	0.0302	1080.0000 0.1881
		255.0000	0.0413	1095.0000 0.1813
		270.0000	0.0541	1110.0000 0.1747
GROUNDWATER (SEEPAGE) VELOCITY =	.61 [m/y]	285.0000	0.0687	1125.0000 0.1682
LONGITUDINAL DISPERSIVITY....	= .55 [m]	300.0000	0.0847	1140.0000 0.1619
RETARDATION FACTOR.....	= 56.92	315.0000	0.1019	1155.0000 0.1557
INITIAL CONCENTRATION.....	= 0 [mg/l]	330.0000	0.1200	1170.0000 0.1497
CONCENTRATION AT SOURCE.....	= 1 [mg/l]	345.0000	0.1388	1185.0000 0.1439
INITIAL TIME.....	= 0 [y]	360.0000	0.1579	1200.0000 0.1382
LENGTH OF TIME STEP.....	= 15 [y]	375.0000	0.1771	
NUMBER OF TIME STEPS.....	= 80	390.0000	0.1961	
NUMBER OF OBSERVATION POINTS..	= 1	405.0000	0.2147	
1 DISTANCE (from source). =	5.5 [m]	420.0000	0.2326	
DURATION OF SOLUTE PULSE.....	= 100000000 [y]	435.0000	0.2497	
HALF-LIFE (0 if no decay)....	= 0 [y]	450.0000	0.2659	
DECAY CONSTANT (lambda).....	= .0000D+00 [1/y]	465.0000	0.2810	
HALF-LIFE at Source.....	= 199.3 [y]	480.0000	0.2949	
DECAY CONSTANT (alpha).....	= .3478D-02 [1/y]	495.0000	0.3076	
		510.0000	0.3189	
		525.0000	0.3290	
		540.0000	0.3378	
		555.0000	0.3453	
		570.0000	0.3515	
		585.0000	0.3565	
		600.0000	0.3602	
		615.0000	0.3629	
		630.0000	0.3644	
		645.0000	0.3649	
		660.0000	0.3645	
		675.0000	0.3631	
		690.0000	0.3610	
		705.0000	0.3581	
		720.0000	0.3564	
		735.0000	0.3502	
		750.0000	0.3454	
		765.0000	0.3400	
		780.0000	0.3343	
		795.0000	0.3281	
		810.0000	0.3216	
		825.0000	0.3148	
		840.0000	0.3077	

CONCENTRATION C [mg/l]

*	ONED	*	TIME [y]	1 DISTANCE 5.50 [m]	
*	INTERNATIONAL GROUND WATER MODELING CENTER	*			
*	Golden, Colorado, USA - Delft, The Netherlands	*			
*	SOLUTE version 2.03	*			
*	ANALYTICAL MODELS FOR SOLUTE TRANSPORT	*			
*****	*****	*****			
PROJECT.....	= SP124B.INP		120.0000	0.0000	6840.0000 0.3630
USER NAME.....	= ASIERRA		240.0000	0.0000	6960.0000 0.3642
DATE.....	= 06-04-1993		360.0000	0.0000	7080.0000 0.3648
DATA FILE.....	= C:\OLIN\SP124B.INP		480.0000	0.0000	7200.0000 0.3649
			600.0000	0.0000	7320.0000 0.3645
			720.0000	0.0000	7440.0000 0.3636
			840.0000	0.0000	7560.0000 0.3623
			960.0000	0.0000	7680.0000 0.3606
			1080.0000	0.0000	7800.0000 0.3585
			1200.0000	0.0000	7920.0000 0.3560
			1320.0000	0.0001	8040.0000 0.3532
			1440.0000	0.0003	8160.0000 0.3500
			1560.0000	0.0006	8280.0000 0.3466
			1680.0000	0.0012	8400.0000 0.3429
			1800.0000	0.0021	8520.0000 0.3390
			1920.0000	0.0036	8640.0000 0.3348
			2040.0000	0.0057	8760.0000 0.3304
		INPUT DATA:	2160.0000	0.0085	8880.0000 0.3258
			2280.0000	0.0121	9000.0000 0.3211
			2400.0000	0.0167	9120.0000 0.3162
	GROUNDWATER (SEEPAGE) VELOCITY = .61 [m/y]		2520.0000	0.0223	9240.0000 0.3112
	LONGITUDINAL DISPERSIVITY.... = .55 [m]		2640.0000	0.0288	9360.0000 0.3060
	RETARDATION FACTOR..... = 631.6900000000001		2760.0000	0.0364	9480.0000 0.3008
	INITIAL CONCENTRATION..... = 0 [mg/l]		2880.0000	0.0449	9600.0000 0.2954
	CONCENTRATION AT SOURCE..... = 1 [mg/l]		3000.0000	0.0544	
	INITIAL TIME..... = 0 [y]		3120.0000	0.0648	
	LENGTH OF TIME STEP..... = 120 [y]		3240.0000	0.0759	
	NUMBER OF TIME STEPS..... = 80		3360.0000	0.0878	
	NUMBER OF OBSERVATION POINTS.. = 1		3480.0000	0.1002	
	1 DISTANCE (from source). = 5.5 [m]		3600.0000	0.1132	
	DURATION OF SOLUTE PULSE..... = 100000000 [y]		3720.0000	0.1265	
	HALF-LIFE (0 if no decay).... = 0 [y]		3840.0000	0.1401	
	DECAY CONSTANT (lambda)..... = .00000+00 [1/y]		3960.0000	0.1539	
	HALF-LIFE at Source..... = 2211.4 [y]		4080.0000	0.1677	
	DECAY CONSTANT (alpha)..... = .31340-03 [1/y]		4200.0000	0.1815	
			4320.0000	0.1952	
			4440.0000	0.2086	
			4560.0000	0.2218	
			4680.0000	0.2346	
			4800.0000	0.2469	
			4920.0000	0.2588	
			5040.0000	0.2701	
			5160.0000	0.2809	
			5280.0000	0.2911	
			5400.0000	0.3006	
			5520.0000	0.3094	
			5640.0000	0.3176	
			5760.0000	0.3251	
			5880.0000	0.3320	
			6000.0000	0.3381	
			6120.0000	0.3436	
			6240.0000	0.3484	
			6360.0000	0.3526	
			6480.0000	0.3561	
			6600.0000	0.3590	
			6720.0000	0.3613	

Woodward-Clyde

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FORMER CPC PLANT AREA

**SOLUTE RUNS
WITH DECAY**

		CONCENTRATION C [mg/l]		
*	ONED	TIME [y]	1 DISTANCE 5.50 [m]	
*	INTERNATIONAL GROUND WATER MODELING CENTER	5.0000	0.0000	285.0000 0.0000
*	Golden, Colorado, USA - Delft, The Netherlands	10.0000	0.0000	290.0000 0.0000
*	S O L U T E version 2.03	15.0000	0.0000	295.0000 0.0000
*	ANALYTICAL MODELS FOR SOLUTE TRANSPORT	20.0000	0.0000	300.0000 0.0000
*		25.0000	0.0000	305.0000 0.0000
*		30.0000	0.0000	310.0000 0.0000
*		35.0000	0.0000	315.0000 0.0000
*		40.0000	0.0000	320.0000 0.0000
*		45.0000	0.0000	325.0000 0.0000
PROJECT.....	= SPBEN1.INP	50.0000	0.0000	330.0000 0.0000
USER NAME.....	= ASIERRA	55.0000	0.0000	335.0000 0.0000
DATE.....	= 06-02-1993	60.0000	0.0000	340.0000 0.0000
DATA FILE.....	= C:\OLIN\SPBEN1.INP	65.0000	0.0000	345.0000 0.0000
		70.0000	0.0000	350.0000 0.0000
		75.0000	0.0000	355.0000 0.0000
	INPUT DATA:	80.0000	0.0000	360.0000 0.0000
		85.0000	0.0000	365.0000 0.0000
		90.0000	0.0000	370.0000 0.0000
GROUNDWATER (SEEPAGE) VELOCITY =	.61 [m/y]	95.0000	0.0000	375.0000 0.0000
LONGITUDINAL DISPERSIVITY....	= .55 [m]	100.0000	0.0000	380.0000 0.0000
RETARDATION FACTOR.....	= 10.47	105.0000	0.0000	385.0000 0.0000
INITIAL CONCENTRATION.....	= 0 [mg/l]	110.0000	0.0000	390.0000 0.0000
CONCENTRATION AT SOURCE.....	= 1 [mg/l]	115.0000	0.0000	395.0000 0.0000
INITIAL TIME.....	= 0 [y]	120.0000	0.0000	400.0000 0.0000
LENGTH OF TIME STEP.....	= 5 [y]	125.0000	0.0000	
NUMBER OF TIME STEPS.....	= 80	130.0000	0.0000	
NUMBER OF OBSERVATION POINTS..	= 1	135.0000	0.0000	
1 DISTANCE (from source). =	5.5 [m]	140.0000	0.0000	
DURATION OF SOLUTE PULSE.....	= 100000000 [y]	145.0000	0.0000	
HALF-LIFE (0 if no decay)....	= 2.2 [y]	150.0000	0.0000	
DECAY CONSTANT (lambda).....	= .3151D+00 [1/y]	155.0000	0.0000	
HALF-LIFE at Source.....	= 36.7 [y]	160.0000	0.0000	
DECAY CONSTANT (alpha).....	= .1889D-01 [1/y]	165.0000	0.0000	
		170.0000	0.0000	
		175.0000	0.0000	
		180.0000	0.0000	
		185.0000	0.0000	
		190.0000	0.0000	
		195.0000	0.0000	
		200.0000	0.0000	
		205.0000	0.0000	
		210.0000	0.0000	
		215.0000	0.0000	
		220.0000	0.0000	
		225.0000	0.0000	
		230.0000	0.0000	
		235.0000	0.0000	
		240.0000	0.0000	
		245.0000	0.0000	
		250.0000	0.0000	
		255.0000	0.0000	
		260.0000	0.0000	
		265.0000	0.0000	
		270.0000	0.0000	
		275.0000	0.0000	
		280.0000	0.0000	

CONCENTRATION C [mg/l]

		TIME [y]	1 DISTANCE 5.50 [m]	CONCENTRATION C [mg/l]
*	ONED	*	*	
*	*	*	*	
*	INTERNATIONAL GROUND WATER MODELING CENTER	*	*	
*	Golden, Colorado, USA - Delft, The Netherlands	*	*	
*	*	*	*	
*	SOLUTE version 2.03	*	4.0000	0.0000 228.0000 0.0017
*	*	*	8.0000	0.0000 232.0000 0.0017
*	ANALYTICAL MODELS FOR SOLUTE TRANSPORT	*	12.0000	0.0000 236.0000 0.0016
*	*	*	16.0000	0.0000 240.0000 0.0016
*	*	*	20.0000	0.0000 244.0000 0.0015
*	*	*	24.0000	0.0000 248.0000 0.0015
*	*	*	28.0000	0.0000 252.0000 0.0014
*	*	*	32.0000	0.0000 256.0000 0.0014
*	*	*	36.0000	0.0000 260.0000 0.0014
*	PROJECT..... = SPCHB1.INP	*	40.0000	0.0000 264.0000 0.0013
*	USER NAME..... = ASIERRA	*	44.0000	0.0000 268.0000 0.0013
*	DATE..... = 06-02-1993	*	48.0000	0.0000 272.0000 0.0012
*	DATA FILE..... = C:\OLIN\SPCHB1.INP	*	52.0000	0.0000 276.0000 0.0012
*	*	*	56.0000	0.0000 280.0000 0.0012
*	*	*	60.0000	0.0001 284.0000 0.0011
*	INPUT DATA:	*	64.0000	0.0001 288.0000 0.0011
*	*	*	68.0000	0.0001 292.0000 0.0011
*	*	*	72.0000	0.0002 296.0000 0.0010
*	GROUNDWATER (SEEPAGE) VELOCITY = .61 [m/y]	*	76.0000	0.0003 300.0000 0.0010
*	LONGITUDINAL DISPERSIVITY.... = .55 [m]	*	80.0000	0.0004 304.0000 0.0010
*	RETARDATION FACTOR..... = 25.58	*	84.0000	0.0005 308.0000 0.0009
*	INITIAL CONCENTRATION..... = 0 [mg/l]	*	88.0000	0.0006 312.0000 0.0009
*	CONCENTRATION AT SOURCE..... = 1 [mg/l]	*	92.0000	0.0008 316.0000 0.0009
*	INITIAL TIME..... = 0 [y]	*	96.0000	0.0009 320.0000 0.0009
*	LENGTH OF TIME STEP..... = 4 [y]	*	100.0000	0.0011
*	NUMBER OF TIME STEPS..... = 80	*	104.0000	0.0012
*	NUMBER OF OBSERVATION POINTS.. = 1	*	108.0000	0.0014
*	1 DISTANCE (from source). = 5.5 [m]	*	112.0000	0.0015
*	DURATION OF SOLUTE PULSE..... = 100000000 [y]	*	116.0000	0.0016
*	HALF-LIFE (0 if no decay)..... = 20.5 [y]	*	120.0000	0.0017
*	DECAY CONSTANT (lambda)..... = .3381D-01 [1/y]	*	124.0000	0.0018
*	HALF-LIFE at Source..... = 89.5999999999999 [y]	*	128.0000	0.0019
*	DECAY CONSTANT (alpha)..... = .7736D-02 [1/y]	*	132.0000	0.0020
*	*	*	136.0000	0.0021
*	*	*	140.0000	0.0021
*	*	*	144.0000	0.0022
*	*	*	148.0000	0.0022
*	*	*	152.0000	0.0022
*	*	*	156.0000	0.0023
*	*	*	160.0000	0.0023
*	*	*	164.0000	0.0023
*	*	*	168.0000	0.0023
*	*	*	172.0000	0.0022
*	*	*	176.0000	0.0022
*	*	*	180.0000	0.0022
*	*	*	184.0000	0.0022
*	*	*	188.0000	0.0021
*	*	*	192.0000	0.0021
*	*	*	196.0000	0.0021
*	*	*	200.0000	0.0020
*	*	*	204.0000	0.0020
*	*	*	208.0000	0.0019
*	*	*	212.0000	0.0019
*	*	*	216.0000	0.0018
*	*	*	220.0000	0.0018
*	*	*	224.0000	0.0017

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		CONCENTRATION C [mg/l]		
*	ONED	*	*	*
*	INTERNATIONAL GROUND WATER MODELING CENTER	*	TIME	1 DISTANCE
*	Golden, Colorado, USA - Delft, The Netherlands	*	[y]	5.50 [m]
*	SOLUTE version 2.03	*	3.0000	0.0000
*		*	6.0000	0.0000
*	ANALYTICAL MODELS FOR SOLUTE TRANSPORT	*	9.0000	0.0000
*		*	12.0000	0.0000
*****	*****	15.0000	0.0000	183.0000 0.0000
		18.0000	0.0000	186.0000 0.0000
		21.0000	0.0000	189.0000 0.0000
		24.0000	0.0000	192.0000 0.0000
PROJECT.....	= SP12D1.INP	27.0000	0.0000	195.0000 0.0000
USER NAME.....	= ASIERRA	30.0000	0.0000	198.0000 0.0000
DATE.....	= 06-02-1993	33.0000	0.0000	201.0000 0.0000
DATA FILE.....	= C:\OLIN\SP12D1.INP	36.0000	0.0000	204.0000 0.0000
		39.0000	0.0000	207.0000 0.0000
		42.0000	0.0000	210.0000 0.0000
		45.0000	0.0000	213.0000 0.0000
INPUT DATA:		48.0000	0.0000	216.0000 0.0000
		51.0000	0.0000	219.0000 0.0000
		54.0000	0.0000	222.0000 0.0000
GROUNDWATER (SEEPAGE) VELOCITY =	.61 [m/y]	57.0000	0.0000	225.0000 0.0000
LONGITUDINAL DISPERSIVITY....	= .55 [m]	60.0000	0.0000	228.0000 0.0000
RETARDATION FACTOR.....	= 112.59	63.0000	0.0000	231.0000 0.0000
INITIAL CONCENTRATION.....	= 0 [mg/l]	66.0000	0.0000	234.0000 0.0000
CONCENTRATION AT SOURCE.....	= 1 [mg/l]	69.0000	0.0000	237.0000 0.0000
INITIAL TIME.....	= 0 [y]	72.0000	0.0000	240.0000 0.0000
LENGTH OF TIME STEP.....	= 3 [y]	75.0000	0.0000	
NUMBER OF TIME STEPS.....	= 80	78.0000	0.0000	
NUMBER OF OBSERVATION POINTS..	= 1	81.0000	0.0000	
1 DISTANCE (from source). =	5.5 [m]	84.0000	0.0000	
DURATION OF SOLUTE PULSE.....	= 100000000 [y]	87.0000	0.0000	
HALF-LIFE (0 if no decay)....	= 24.7 [y]	90.0000	0.0000	
DECAY CONSTANT (lambda).....	= .2806D-01 [1/y]	93.0000	0.0000	
HALF-LIFE at Source.....	= 394.2 [y]	96.0000	0.0000	
DECAY CONSTANT (alpha).....	= .1758D-02 [1/y]	99.0000	0.0000	
		102.0000	0.0000	
		105.0000	0.0000	
		108.0000	0.0000	
		111.0000	0.0000	
		114.0000	0.0000	
		117.0000	0.0000	
		120.0000	0.0000	
		123.0000	0.0000	
		126.0000	0.0000	
		129.0000	0.0000	
		132.0000	0.0000	
		135.0000	0.0000	
		138.0000	0.0000	
		141.0000	0.0000	
		144.0000	0.0000	
		147.0000	0.0000	
		150.0000	0.0000	
		153.0000	0.0000	
		156.0000	0.0000	
		159.0000	0.0000	
		162.0000	0.0000	
		165.0000	0.0000	
		168.0000	0.0000	

CONCENTRATION C [mg/l]

ONED	TIME [y]	1 DISTANCE [m]	C [mg/l]
INTERNATIONAL GROUND WATER MODELING CENTER	4.0000	0.0000	228.0000 0.0000
Golden, Colorado, USA - Delft, The Netherlands	8.0000	0.0000	232.0000 0.0000
SOLUTE version 2.03	12.0000	0.0000	236.0000 0.0000
ANALYTICAL MODELS FOR SOLUTE TRANSPORT	16.0000	0.0000	240.0000 0.0000
	20.0000	0.0000	244.0000 0.0000
	24.0000	0.0000	248.0000 0.0000
	28.0000	0.0000	252.0000 0.0000
	32.0000	0.0000	256.0000 0.0000
	36.0000	0.0000	260.0000 0.0000
PROJECT..... = SP13D1.INP	40.0000	0.0000	264.0000 0.0000
USER NAME.... = ASIERRA	44.0000	0.0000	268.0000 0.0000
DATE..... = 06-02-1993	48.0000	0.0000	272.0000 0.0000
DATA FILE.... = C:\OLIN\SP13D1.INP	52.0000	0.0000	276.0000 0.0000
	56.0000	0.0000	280.0000 0.0000
	60.0000	0.0000	284.0000 0.0000
	64.0000	0.0000	288.0000 0.0000
INPUT DATA:	68.0000	0.0000	292.0000 0.0000
	72.0000	0.0000	296.0000 0.0000
	76.0000	0.0000	300.0000 0.0000
GROUNDWATER (SEEPAGE) VELOCITY = .61 [m/y]	80.0000	0.0000	304.0000 0.0000
LONGITUDINAL DISPERSIVITY.... = .55 [m]	84.0000	0.0000	308.0000 0.0000
RETARDATION FACTOR..... = 84.79000000000001	88.0000	0.0000	312.0000 0.0000
INITIAL CONCENTRATION..... = 0 [mg/l]	92.0000	0.0000	316.0000 0.0000
CONCENTRATION AT SOURCE..... = 1 [mg/l]	96.0000	0.0000	320.0000 0.0000
INITIAL TIME..... = 0 [y]	100.0000	0.0000	
LENGTH OF TIME STEP..... = 4 [y]	104.0000	0.0000	
NUMBER OF TIME STEPS..... = 80	108.0000	0.0000	
NUMBER OF OBSERVATION POINTS.. = 1	112.0000	0.0000	
1 DISTANCE (from source). = 5.5 [m]	116.0000	0.0000	
DURATION OF SOLUTE PULSE..... = 100000000 [y]	120.0000	0.0000	
HALF-LIFE (0 if no decay).... = 24.7 [y]	124.0000	0.0000	
DECAY CONSTANT (lambda)..... = .28060-01 [1/y]	128.0000	0.0000	
HALF-LIFE at Source..... = 296.8 [y]	132.0000	0.0000	
DECAY CONSTANT (alpha)..... = .23350-02 [1/y]	136.0000	0.0000	
	140.0000	0.0000	
	144.0000	0.0000	
	148.0000	0.0000	
	152.0000	0.0000	
	156.0000	0.0000	
	160.0000	0.0000	
	164.0000	0.0000	
	168.0000	0.0000	
	172.0000	0.0000	
	176.0000	0.0000	
	180.0000	0.0000	
	184.0000	0.0000	
	188.0000	0.0000	
	192.0000	0.0000	
	196.0000	0.0000	
	200.0000	0.0000	
	204.0000	0.0000	
	208.0000	0.0000	
	212.0000	0.0000	
	216.0000	0.0000	
	220.0000	0.0000	
	224.0000	0.0000	

CONCENTRATION C [mg/l]

*	ONED	*	TIME [y]	1 DISTANCE 5.50 [m]	
*	INTERNATIONAL GROUND WATER MODELING CENTER	*	3.0000	0.0000	171.0000 0.0000
*	Golden, Colorado, USA - Delft, The Netherlands	*	6.0000	0.0000	174.0000 0.0001
*	SOLUTE version 2.03	*	9.0000	0.0000	177.0000 0.0001
*	ANALYTICAL MODELS FOR SOLUTE TRANSPORT	*	12.0000	0.0000	180.0000 0.0001
*		*	15.0000	0.0000	183.0000 0.0001
*		*	18.0000	0.0000	186.0000 0.0001
*		*	21.0000	0.0000	189.0000 0.0001
*		*	24.0000	0.0000	192.0000 0.0001
*		*	27.0000	0.0000	195.0000 0.0001
*		*	30.0000	0.0000	198.0000 0.0001
PROJECT.....	= SP14D1.INP		33.0000	0.0000	201.0000 0.0001
USER NAME.....	= ASIERRA		36.0000	0.0000	204.0000 0.0001
DATE.....	= 06-02-1993		39.0000	0.0000	207.0000 0.0001
DATA FILE.....	= C:\OLIN\SP14D1.INP		42.0000	0.0000	210.0000 0.0001
			45.0000	0.0000	213.0000 0.0001
			48.0000	0.0000	216.0000 0.0001
			51.0000	0.0000	219.0000 0.0001
			54.0000	0.0000	222.0000 0.0001
			57.0000	0.0000	225.0000 0.0001
			60.0000	0.0000	228.0000 0.0001
GROUNDWATER (SEEPAGE) VELOCITY =	.61 [m/y]		63.0000	0.0000	231.0000 0.0001
LONGITUDINAL DISPERSIVITY....	= .55 [m]		66.0000	0.0000	234.0000 0.0001
RETARDATION FACTOR.....	= 56.92		69.0000	0.0000	237.0000 0.0001
INITIAL CONCENTRATION.....	= 0 [mg/l]		72.0000	0.0000	240.0000 0.0001
CONCENTRATION AT SOURCE.....	= 1 [mg/l]		75.0000	0.0000	
INITIAL TIME.....	= 0 [y]		78.0000	0.0000	
LENGTH OF TIME STEP.....	= 3 [y]		81.0000	0.0000	
NUMBER OF TIME STEPS.....	= 80		84.0000	0.0000	
NUMBER OF OBSERVATION POINTS..	= 1		87.0000	0.0000	
1 DISTANCE (from source). =	5.5 [m]		90.0000	0.0000	
DURATION OF SOLUTE PULSE.....	= 100000000 [y]		93.0000	0.0000	
HALF-LIFE (0 if no decay)....	= 24.7 [y]		96.0000	0.0000	
DECAY CONSTANT (lambda).....	= .28060-01 [1/y]		99.0000	0.0000	
HALF-LIFE at Source.....	= 199.3 [y]		102.0000	0.0000	
DECAY CONSTANT (alpha).....	= .34780-02 [1/y]		105.0000	0.0000	
			108.0000	0.0000	
			111.0000	0.0000	
			114.0000	0.0000	
			117.0000	0.0000	
			120.0000	0.0000	
			123.0000	0.0000	
			126.0000	0.0000	
			129.0000	0.0000	
			132.0000	0.0000	
			135.0000	0.0000	
			138.0000	0.0000	
			141.0000	0.0000	
			144.0000	0.0000	
			147.0000	0.0000	
			150.0000	0.0000	
			153.0000	0.0000	
			156.0000	0.0000	
			159.0000	0.0000	
			162.0000	0.0000	
			165.0000	0.0000	
			168.0000	0.0000	

CONCENTRATION C [mg/l]

*****		TIME	1 DISTANCE		
		[y]	5.50 [m]		
*	ONED				
*					
*	INTERNATIONAL GROUND WATER MODELING CENTER				
*	Golden, Colorado, USA - Delft, The Netherlands				
*					
*	SOLUTE version 2.03				
*					
*	ANALYTICAL MODELS FOR SOLUTE TRANSPORT				
*					
*****	*****				
		4.0000	0.0000	228.0000	0.0000
		8.0000	0.0000	232.0000	0.0000
		12.0000	0.0000	236.0000	0.0000
		16.0000	0.0000	240.0000	0.0000
		20.0000	0.0000	244.0000	0.0000
		24.0000	0.0000	248.0000	0.0000
		28.0000	0.0000	252.0000	0.0000
		32.0000	0.0000	256.0000	0.0000
		36.0000	0.0000	260.0000	0.0000
		40.0000	0.0000	264.0000	0.0000
PROJECT.....	= SP1241.INP	44.0000	0.0000	268.0000	0.0000
USER NAME.....	= ASTIERRA	48.0000	0.0000	272.0000	0.0000
DATE.....	= 06-02-1993	52.0000	0.0000	276.0000	0.0000
DATA FILE.....	= C:\OLIN\SP1241.INP	56.0000	0.0000	280.0000	0.0000
		60.0000	0.0000	284.0000	0.0000
		64.0000	0.0000	288.0000	0.0000
	INPUT DATA:	68.0000	0.0000	292.0000	0.0000
		72.0000	0.0000	296.0000	0.0000
		76.0000	0.0000	300.0000	0.0000
GROUNDWATER (SEEPAGE) VELOCITY =	.61 [m/y]	80.0000	0.0000	304.0000	0.0000
LONGITUDINAL DISPERSIVITY.....	= .55 [m]	84.0000	0.0000	308.0000	0.0000
RETARDATION FACTOR.....	= 631.690000000001	88.0000	0.0000	312.0000	0.0000
INITIAL CONCENTRATION.....	= 0 [mg/l]	92.0000	0.0000	316.0000	0.0000
CONCENTRATION AT SOURCE.....	= 1 [mg/l]	96.0000	0.0000	320.0000	0.0000
INITIAL TIME.....	= 0 [y]	100.0000	0.0000		
LENGTH OF TIME STEP.....	= 4 [y]	104.0000	0.0000		
NUMBER OF TIME STEPS.....	= 80	108.0000	0.0000		
NUMBER OF OBSERVATION POINTS..	= 1	112.0000	0.0000		
1 DISTANCE (from source). =	5.5 [m]	116.0000	0.0000		
DURATION OF SOLUTE PULSE.....	= 100000000 [y]	120.0000	0.0000		
HALF-LIFE (0 if no decay)....	= 24.7 [y]	124.0000	0.0000		
DECAY CONSTANT (lambda).....	= .2806D-01 [1/y]	128.0000	0.0000		
HALF-LIFE at Source.....	= 2211.4 [y]	132.0000	0.0000		
DECAY CONSTANT (alpha).....	= .3134D-03 [1/y]	136.0000	0.0000		
		140.0000	0.0000		
		144.0000	0.0000		
		148.0000	0.0000		
		152.0000	0.0000		
		156.0000	0.0000		
		160.0000	0.0000		
		164.0000	0.0000		
		168.0000	0.0000		
		172.0000	0.0000		
		176.0000	0.0000		
		180.0000	0.0000		
		184.0000	0.0000		
		188.0000	0.0000		
		192.0000	0.0000		
		196.0000	0.0000		
		200.0000	0.0000		
		204.0000	0.0000		
		208.0000	0.0000		
		212.0000	0.0000		
		216.0000	0.0000		
		220.0000	0.0000		
		224.0000	0.0000		

Woodward-Clyde

3 8 16

OLD PLANT (CPC) LANDFILL AREA

**PESTAN RUNS
NO DECAY**

PESTAN
version 4.0, 1992.

Developed by :

Varadhan Ravi and Jeffrey A. Johnson (Dynamac)
Center for Subsurface Modeling Support
Robert S. Kerr Environmental Research Laboratory
U.S. Environmental Protection Agency
P.O. Box 1198
Ada, OK 74820

Title: BASE CASE BENZENE LANDFILL PLBENB

Solubility (mg/l): 0.17910E+04
Recharge rate (cm/hr).....: 0.65800E-03
Sorption constant (cc/g)....: 0.70000E+00
Saturated water content: 0.40000E+00
Solid-phase decay (/hr): 0.00000E+00
Liquid-phase decay (/hr): 0.00000E+00
Curve coefficient: 0.50000E+01
Bulk density (g/cc).....: 0.15900E+01
Dispersion coefficient (cm^2/hr)....: 0.18200E+00
Saturated hydraulic conductivity: 0.36000E+00
Minimum depth (cm).....: 0.00000E+00
Maximum depth (cm).....: 0.68300E+03
Minimum time (day).....: 0.00000E+00
Maximum time (day).....: 0.50000E+06

For application 1 the active ingredient (ai) applied is 0.930E+02 kg ai/ha,
and has been applied 0.100E+01 days prior to recharge

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Results

Projected water content: 0.246E+00
Pore water velocity [cm/hr]: 0.267E-02
Pollutant velocity [cm/hr]: 0.484E-03
Length of pollutant slug [cm]: 0.382E+00
Mass decayed prior to recharge [kg]: 0.000E+00

BASE CASE BENZENE LANDFILL PLBENB

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1622

DAYS	UG/L		
0.100000E-29	0.000000		
5050.50	0.000000		
10101.0	0.106752		
15151.5	8.27327		
20202.0	65.7592	262626.	0.480384
25252.5	206.056	267677.	0.373632
30303.0	397.384	272727.	0.320256
35353.5	594.448	277778.	0.266880
40404.0	755.056	282828.	0.213504
45454.5	860.928	287879.	0.160128
50505.0	910.834	292929.	0.106752
55555.6	913.009	297980.	0.160128
60606.1	879.252	303030.	0.106752
65656.6	821.269	308081.	0.106752
70707.1	749.105	313131.	0.533760E-01
75757.6	670.482	318182.	0.000000
80808.1	591.139	323232.	0.533760E-01
85858.6	514.811	328283.	0.000000
90909.1	443.714	333333.	0.533760E-01
95959.6	379.236	338384.	0.533760E-01
101010.	321.804	343434.	0.533760E-01
106061.	271.523	348485.	0.533760E-01
111111.	227.809	353535.	0.000000
116162.	190.232	358586.	0.533760E-01
121212.	158.366	363636.	0.000000
126263.	131.305	368687.	0.000000
131313.	108.620	373737.	0.000000
136364.	89.5649	378788.	0.533760E-01
141414.	73.7122	383838.	0.000000
146465.	60.5283	388889.	0.000000
151515.	49.6396	393939.	0.000000
156566.	40.6191	398990.	0.000000
161616.	33.1998	404040.	0.000000
166667.	27.0616	409091.	0.000000
171717.	22.0976	414141.	0.000000
176768.	17.9877	419192.	0.000000
181818.	14.6250	424242.	0.000000
186869.	11.9028	429293.	0.000000
191919.	9.66105	434343.	0.000000
196970.	7.84627	439394.	0.000000
202020.	6.35174	444444.	0.000000
207071.	5.17747	449495.	0.000000
212121.	4.16332	454545.	0.000000
217172.	3.36269	459596.	0.000000
222222.	2.72217	464646.	0.000000
227273.	2.18841	469697.	0.000000
232323.	1.76141	474747.	0.000000
237374.	1.44115	479798.	0.000000
242424.	1.17427	484848.	0.000000
247475.	0.960767	489899.	0.000000
252525.	0.800639	494949.	0.000000
257576.	0.587136	500000.	0.000000

PESTAN
version 4.0, 1992.

Developed by :

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Ada, OK 74820

Title: BASE CASE, CHLOROBENZENE LANDFILL PLCHBB

Solubility (mg/l): 0.47170E+03
Recharge rate (cm/hr).....: 0.65800E-03
Sorption constant (cc/g)....: 0.18800E+01
Saturated water content: 0.40000E+00
Solid-phase decay (/hr): 0.00000E+00
Liquid-phase decay (/hr): 0.00000E+00
Curve coefficient: 0.50000E+01
Bulk density (g/cc).....: 0.15900E+01
Dispersion coefficient (cm²/hr)....: 0.18200E+00
Saturated hydraulic conductivity: 0.36000E+00
Minimum depth (cm).....: 0.00000E+00
Maximum depth (cm).....: 0.68300E+03
Minimum time (day).....: 0.00000E+00
Maximum time (day).....: 0.40000E+06

For application 1 the active ingredient (ai) applied is 0.440E+04 kg ai/ha,
and has been applied 0.100E+01 days prior to recharge

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Results

Projected water content: 0.246E+00
Pore water velocity [cm/hr]: 0.267E-02
Pollutant velocity [cm/hr]: 0.203E-03
Length of pollutant slug [cm]: 0.288E+02
Mass decayed prior to recharge [kg]: 0.000E+00

DAYS	UG/L		
0.100000E-29	0.000000		
4040.40	0.000000		
8080.81	0.000000		
12121.2	0.000000		
16161.6	0.000000	210101.	9874.28
20202.0	0.000000	214141.	9401.77
24242.4	1.34954	218182.	8942.59
28282.8	9.93883	222222.	8497.51
32323.2	43.1433	226263.	8067.14
36363.6	132.283	230303.	7651.89
40404.0	317.888	234343.	7252.02
44444.4	640.190	238384.	6867.71
48484.8	1129.61	242424.	6498.94
52525.3	1800.81	246465.	6145.69
56565.7	2651.29	250505.	5807.79
60606.1	3663.28	254545.	5485.01
64646.5	4807.65	258586.	5177.06
68686.9	6048.38	262626.	4883.62
72727.3	7346.60	266667.	4604.32
76767.7	8664.01	270707.	4338.79
80808.1	9965.21	274747.	4086.53
84848.5	11219.4	278788.	3847.13
88888.9	12400.9	282828.	3620.17
92929.3	13489.8	286869.	3405.11
96969.7	14471.1	290909.	3201.56
101010.	15335.2	294950.	3008.98
105051.	16076.5	298990.	2826.94
109091.	16693.4	303030.	2654.98
113131.	17186.9	307071.	2492.62
117172.	17561.0	311111.	2339.44
121212.	17821.0	315152.	2194.96
125253.	17974.0	319192.	2058.80
129293.	18027.8	323232.	1930.54
133333.	17991.0	327273.	1809.77
137374.	17872.3	331313.	1696.10
141414.	17680.4	335354.	1589.16
145455.	17424.0	339394.	1488.59
149495.	17111.3	343434.	1394.08
153535.	16750.4	347475.	1305.28
157576.	16348.7	351515.	1221.84
161616.	15913.4	355556.	1143.53
165657.	15450.6	359596.	1069.99
169697.	14966.4	363636.	1001.00
173737.	14466.1	367677.	936.275
177778.	13954.5	371717.	875.601
181818.	13435.8	375758.	818.696
185859.	12914.0	379798.	765.360
189899.	12392.2	383838.	715.399
193939.	11873.5	387879.	668.587
197980.	11360.4	391919.	624.755
202020.	10855.0	395960.	583.692
206061.	10359.1	400000.	545.258

PESTAN
version 4.0, 1992.

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Title: BASE CASE, 1,2 dichlorobenzene. LANDFILL PL12DB

Solubility (mg/l): 0.15600E+03
Recharge rate (cm/hr).....: 0.65800E-03
Sorption constant (cc/g).....: 0.86100E+01
Saturated water content: 0.40000E+00
Solid-phase decay (/hr): 0.00000E+00
Liquid-phase decay (/hr): 0.00000E+00
Curve coefficient: 0.50000E+01
Bulk density (g/cc).....: 0.15900E+01
Dispersion coefficient (cm^2/hr).....: 0.18200E+00
Saturated hydraulic conductivity: 0.36000E+00
Minimum depth (cm).....: 0.00000E+00
Maximum depth (cm).....: 0.68300E+03
Minimum time (day).....: 0.00000E+00
Maximum time (day).....: 0.10000E+07

For application 1 the active ingredient (ai) applied is 0.164E+06 kg ai/ha,
and has been applied 0.100E+01 days prior to recharge

Results

Projected water content: 0.246E+00
Pore water velocity [cm/hr]: 0.267E-02
Pollutant velocity [cm/hr]: 0.472E-04
Length of pollutant slug [cm]: 0.754E+03
Mass decayed prior to recharge [kg]: 0.000E+00

DAYS	UG/L		
0.100000E-29	0.000000		
10101.0	0.000000		
20202.0	0.000000		
30303.0	0.000000		
40404.0	0.000000	525253.	58868.8
50505.0	0.000000	535354.	61362.1
60606.1	0.000000	545455.	63823.6
70707.1	0.000000	555556.	66248.4
80808.1	0.000000	565657.	68631.6
90909.1	0.743866E-01	575758.	70968.9
101010.	0.413775	585859.	73255.9
111111.	1.641115	595960.	75488.8
121212.	5.18382	606061.	77663.8
131313.	13.6964	616162.	79777.3
141414.	31.4655	626263.	81826.2
151515.	64.6280	636364.	83807.4
161616.	121.185	646465.	85718.2
171717.	210.793	656566.	87556.0
181818.	344.382	666667.	89318.5
191919.	533.663	676768.	91003.6
202020.	790.599	686869.	92609.4
212121.	1126.89	696970.	94134.4
222222.	1553.50	707071.	95577.1
232323.	2080.30	717172.	96936.4
242424.	2715.74	727273.	98211.3
252525.	3466.73	737374.	99400.9
262626.	4338.44	747475.	100505.
272727.	5334.37	757576.	101523.
282828.	6456.31	767677.	102454.
292929.	7704.48	777778.	103300.
303030.	9077.59	787879.	104059.
313131.	10573.0	797980.	104733.
323232.	12186.9	808081.	105321.
333333.	13914.6	818182.	105826.
343434.	15750.3	828283.	106247.
353535.	17687.6	838384.	106586.
363636.	19719.7	848485.	106843.
373737.	21839.1	858586.	107021.
383838.	24038.3	868687.	107121.
393939.	26309.3	878788.	107143.
404040.	28644.2	888889.	107091.
414141.	31035.1	898990.	106965.
424242.	33473.8	909091.	106768.
434343.	35952.7	919192.	106501.
444444.	38464.1	929293.	106167.
454545.	41000.3	939394.	105768.
464646.	43554.2	949495.	105305.
474747.	46118.6	959596.	104781.
484848.	48686.7	969697.	104199.
494949.	51252.0	979798.	103560.
505051.	53808.1	989899.	102867.
515152.	56348.9	0.100000E+07	102122.

3 8 1627

PESTAN
version 4.0, 1992.

Developed by :

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P.O. Box 1198
Ada, OK 74820

Title: BASE CASE, 1,3 dichlorobenzene. LANDFILL PL13DB

Solubility (mg/l) 0.11100E+03
Recharge rate (cm/hr)..... 0.65800E-03
Sorption constant (cc/g)..... 0.64600E+01
Saturated water content 0.40000E+00
Solid-phase decay (/hr) 0.00000E+00
Liquid-phase decay (/hr) 0.00000E+00
Curve coefficient 0.50000E+01
Bulk density (g/cc)..... 0.15900E+01
Dispersion coefficient (cm^2/hr).... 0.18200E+00
Saturated hydraulic conductivity 0.36000E+00
Minimum depth (cm)..... 0.00000E+00
Maximum depth (cm)..... 0.68300E+03
Minimum time (day)..... 0.00000E+00
Maximum time (day)..... 0.13000E+07

For application 1 the active ingredient (ai) applied is 0.235E+06 kg ai/ha,
and has been applied 0.100E+01 days prior to recharge

+++++

Results

Projected water content 0.246E+00
Pore water velocity [cm/hr] 0.267E-02
Pollutant velocity [cm/hr] 0.626E-04
Length of pollutant slug [cm] 0.201E+04
Mass decayed prior to recharge [kg] 0.000E+00

BASE CASE, 1,3 DICHLOROBENZENE LANDFILL PL1308

3 8 1622

DAYS	UG/L		
0.100000E-29	0.000000		
13131.3	0.000000		
26262.6	0.000000		
39393.9	0.000000		
52525.3	0.000000	682828.	91030.3
65656.6	0.000000	695960.	92273.4
78787.9	0.479668	709091.	93445.9
91919.2	3.92005	722222.	94551.0
105051.	18.8427	735354.	95591.8
118182.	63.7330	748485.	96571.2
131313.	168.383	761616.	97492.2
144444.	371.581	774748.	98357.5
157576.	716.221	787879.	99170.0
170707.	1263.79	801010.	99932.1
183838.	1989.76	814141.	100646.
196970.	2980.52	827273.	101315.
210101.	4231.98	840404.	101940.
223232.	5749.60	853535.	102524.
236364.	7529.28	866667.	103068.
249495.	9558.85	879798.	103574.
262626.	11819.8	892929.	104043.
275758.	14289.1	906061.	104477.
288889.	16940.5	919192.	104878.
302020.	19746.4	932323.	105245.
315152.	22678.5	945455.	105580.
328283.	25709.1	958586.	105883.
341414.	28811.5	971717.	106155.
354545.	31960.6	984849.	106396.
367677.	35133.4	997980.	106607.
380808.	38308.9	0.101111E+07	106787.
393939.	41468.4	0.102424E+07	106936.
407071.	44595.3	0.103737E+07	107054.
420202.	47675.3	0.105051E+07	107141.
433333.	50696.1	0.106364E+07	107196.
446465.	53647.5	0.107677E+07	107219. ✓
459596.	56521.0	0.108990E+07	107209.
472727.	59309.7	0.110303E+07	107165.
485859.	62008.3	0.111616E+07	107087.
498990.	64612.8	0.112929E+07	106973.
512121.	67120.5	0.114242E+07	106824.
525253.	69529.5	0.115556E+07	106638.
538384.	71839.0	0.116869E+07	106414.
551515.	74049.0	0.118182E+07	106152.
564647.	76160.1	0.119495E+07	105850.
577778.	78173.5	0.120808E+07	105509.
590909.	80090.9	0.122121E+07	105127.
604040.	81914.3	0.123434E+07	104704.
617172.	83646.2	0.124747E+07	104239.
630303.	85289.1	0.126061E+07	103732.
643434.	86846.0	0.127374E+07	103183.
656566.	88319.7	0.128687E+07	102590.
669697.	89713.4	0.130000E+07	101955.

PESTAN
version 4.0, 1992.

Developed by :

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Title: BASE CASE, 1,4 dichlorobenzene. LANDFILL PL14DB

Solubility (mg/l): 0.87000E+02
Recharge rate (cm/hr).....: 0.65800E-03
Sorption constant (cc/g)....: 0.43100E+01
Saturated water content: 0.40000E+00
Solid-phase decay (/hr): 0.00000E+00
Liquid-phase decay (/hr): 0.00000E+00
Curve coefficient: 0.50000E+01
Bulk density (g/cc).....: 0.15900E+01
Dispersion coefficient (cm^2/hr).....: 0.18200E+00
Saturated hydraulic conductivity: 0.36000E+00
Minimum depth (cm).....: 0.00000E+00
Maximum depth (cm).....: 0.68300E+03
Minimum time (day).....: 0.00000E+00
Maximum time (day).....: 0.40000E+06

For application 1 the active ingredient (ai) applied is 0.750E+04 kg ai/ha,
and has been applied 0.100E+01 days prior to recharge

Results

Projected water content: 0.246E+00
Pore water velocity [cm/hr]: 0.267E-02
Pollutant velocity [cm/hr]: 0.927E-04
Length of pollutant slug [cm]: 0.121E+03
Mass decayed prior to recharge [kg]: 0.000E+00

BASE CASE 1,4 DICHLOROBENZENE LANDFILL PL1408

3 8 1637

DAYS	ug/l		
0.100000E-29	0.000000		
4040.40	0.000000		
8080.81	0.000000		
12121.2	0.000000		
16161.6	0.000000	210101.	9186.31
20202.0	0.000000	214141.	9546.77
24242.4	0.000000	218182.	9893.98
28282.8	0.000000	222222.	10227.0
32323.2	0.000000	226263.	10545.1
36363.6	0.000000	230303.	10847.7
40404.0	0.000000	234343.	11134.2
44444.4	0.000000	238384.	11404.1
48484.8	0.907481E-01	242424.	11657.2
52525.3	0.313729	246465.	11893.3
56565.7	0.907481	250505.	12112.2
60606.1	2.24537	254545.	12313.9
64646.5	4.99114	258586.	12498.4
68686.9	10.0808	262626.	12665.8
72727.3	18.7874	266667.	12816.2
76767.7	32.7108	270707.	12950.0
80808.1	53.7488	274747.	13067.3
84848.5	84.0249	278788.	13168.5
88888.9	125.816	282828.	13254.0
92929.3	181.434	286869.	13324.1
96969.7	253.151	290909.	13379.3
101010.	343.082	294950.	13420.0
105051.	453.121	298990.	13446.7
109091.	584.853	303030.	13459.8
113131.	739.516	307071.	13460.0
117172.	917.966	311111.	13447.6
121212.	1120.65	315152.	13423.3
125253.	1347.63	319192.	13387.5
129293.	1598.57	323232.	13340.8
133333.	1872.78	327273.	13283.7
137374.	2169.22	331313.	13216.8
141414.	2486.57	335354.	13140.4
145455.	2823.28	339394.	13055.3
149495.	3177.54	343434.	12961.8
153535.	3547.42	347475.	12860.6
157576.	3930.85	351515.	12752.0
161616.	4325.67	355556.	12636.5
165657.	4729.68	359596.	12514.7
169697.	5140.66	363636.	12386.9
173737.	5556.42	367677.	12253.6
177778.	5974.80	371717.	12115.3
181818.	6393.72	375758.	11972.4
185859.	6811.16	379798.	11825.2
189899.	7225.22	383838.	11674.2
193939.	7634.10	387879.	11519.8
197980.	8036.14	391919.	11362.2
202020.	8429.77	395960.	11201.8
206061.	8813.58	400000.	11039.0

3 8 1631

PESTAN
version 4.0, 1992.

Developed by :

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Title: BASE CASE, 1,2,4-Trichlorobenzene. LANDFILL PL124B

Solubility (mg/l)	0.48800E+02
Recharge rate (cm/hr).....	0.65800E-03
Sorption constant (cc/g).....	0.48690E+02
Saturated water content	0.40000E+00
Solid-phase decay (/hr)	0.00000E+00
Liquid-phase decay (/hr)	0.00000E+00
Curve coefficient	0.50000E+01
Bulk density (g/cc).....	0.15900E+01
Dispersion coefficient (cm^2/hr).....	0.18200E+00
Saturated hydraulic conductivity	0.36000E+00
Minimum depth (cm).....	0.00000E+00
Maximum depth (cm).....	0.68300E+03
Minimum time (day).....	0.00000E+00
Maximum time (day).....	0.13000E+08

For application 1 the active ingredient (ai) applied is 0.800E+05 kg ai/ha, and has been applied 0.100E+01 days prior to recharge.

Results

Projected water content	0.246E+00
Pore water velocity [cm/hr]	0.267E-02
Pollutant velocity [cm/hr]	0.847E-05
Length of pollutant slug [cm]	0.211E+03
Mass decayed prior to recharge [kg]	0.000E+00

BASE CASE 1,2,4 TRICHLOROBENZENE LANDFILL PL1248

3 8 1632

DAYS	UG/L		
0.100000E-29	0.000000		
131313.	0.000000		
262626.	0.000000		
393939.	0.000000		
525253.	0.436306E-01		
656566.	1.12712		
787879.	9.81688	0.695960E+07	3413.95
919192.	45.6114	0.709091E+07	3162.89
0.105050E+07	143.132	0.722222E+07	2927.55
0.118182E+07	344.523	0.735353E+07	2707.33
0.131313E+07	687.383	0.748485E+07	2501.60
0.144444E+07	1194.63	0.761616E+07	2309.67
0.157576E+07	1869.80	0.774747E+07	2130.87
0.170707E+07	2697.69	0.787879E+07	1964.53
0.183838E+07	3648.53	0.801010E+07	1809.95
0.196970E+07	4683.51	0.814141E+07	1666.48
0.210101E+07	5760.30	0.827273E+07	1533.45
0.223232E+07	6837.54	0.840404E+07	1410.22
0.236364E+07	7878.03	0.853535E+07	1296.19
0.249495E+07	8850.61	0.866667E+07	1190.76
0.262626E+07	9731.09	0.879798E+07	1093.35
0.275758E+07	10502.3	0.892929E+07	1003.45
0.288889E+07	11153.5	0.906061E+07	920.516
0.302020E+07	11679.7	0.919192E+07	844.075
0.315151E+07	12080.9	0.932323E+07	773.661
0.328283E+07	12360.5	0.945454E+07	708.845
0.341414E+07	12525.2	0.958586E+07	649.212
0.354545E+07	12583.6	0.971717E+07	594.383
0.367677E+07	12545.4	0.984848E+07	543.997
0.380808E+07	12421.5	0.997980E+07	497.718
0.393939E+07	12222.6	0.101111E+08	455.230
0.407071E+07	11959.6	0.102424E+08	416.246
0.420202E+07	11642.9	0.103737E+08	380.488
0.433333E+07	11282.3	0.105050E+08	347.705
0.446465E+07	10886.8	0.106364E+08	317.661
0.459596E+07	10464.7	0.107677E+08	290.139
0.472727E+07	10023.6	0.108990E+08	264.935
0.485859E+07	9569.94	0.110303E+08	241.866
0.498990E+07	9109.59	0.111616E+08	220.752
0.512121E+07	8647.54	0.112929E+08	201.438
0.525252E+07	8188.06	0.114242E+08	183.775
0.538384E+07	7734.75	0.115556E+08	167.627
0.551515E+07	7290.59	0.116869E+08	152.869
0.564646E+07	6858.00	0.118182E+08	139.382
0.577778E+07	6438.91	0.119495E+08	127.061
0.590909E+07	6034.80	0.120808E+08	115.810
0.604040E+07	5646.77	0.122121E+08	105.538
0.617172E+07	5275.58	0.123434E+08	96.1604
0.630303E+07	4921.71	0.124747E+08	87.6030
0.643434E+07	4585.41	0.126061E+08	79.7945
0.656566E+07	4266.69	0.127374E+08	72.6711
0.669697E+07	3965.41	0.128687E+08	66.1760
0.682828E+07	3681.30	0.130000E+08	60.2509

3 8 1633

PESTAN
version 4.0, 1992.

Developed by :

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| Ada, OK 74820

Title: BASE CASE, MERCURY LANDFILL PLMERB

Solubility (mg/l): 0.70000E+00
Recharge rate (cm/hr).....: 0.65800E-03
Sorption constant (cc/g)....: 0.10715E+03
Saturated water content: 0.40000E+00
Solid-phase decay (/hr): 0.00000E+00
Liquid-phase decay (/hr): 0.00000E+00
Curve coefficient: 0.50000E+01
Bulk density (g/cc).....: 0.15900E+01
Dispersion coefficient (cm^2/hr)....: 0.18200E+00
Saturated hydraulic conductivity: 0.36000E+00
Minimum depth (cm).....: 0.00000E+00
Maximum depth (cm).....: 0.68300E+03
Minimum time (day).....: 0.00000E+00
Maximum time (day).....: 0.10000E+08

For application 1 the active ingredient (ai) applied is 0.580E+04 kg ai/ha,
and has been applied 0.100E+01 days prior to recharge

++++++
Results

Projected water content: 0.246E+00
Pore water velocity [cm/hr]: 0.267E-02
Pollutant velocity [cm/hr]: 0.386E-05
Length of pollutant slug [cm]: 0.486E+03
Mass decayed prior to recharge [kg]: 0.000E+00

BASE CASE MERCURY LANDFILL PLMERB

3 8 1634

DAYS	UG/L		
0.100000E-29	0.000000		
101010.	0.000000		
202020.	0.000000		
303030.	0.000000		
404040.	0.000000	0.525253E+07	152.737
505051.	0.000000	0.535354E+07	161.346
606061.	0.000000	0.545455E+07	169.974
707071.	0.000000	0.555556E+07	178.595
808081.	0.000000	0.565657E+07	187.188
909091.	0.000000	0.575758E+07	195.730
0.101010E+07	0.000000	0.585859E+07	204.199
0.111111E+07	0.333786E-03	0.595960E+07	212.575
0.121212E+07	0.135601E-02	0.606061E+07	220.837
0.131313E+07	0.448525E-02	0.616162E+07	228.967
0.141414E+07	0.124544E-01	0.626263E+07	236.947
0.151515E+07	0.301659E-01	0.636364E+07	244.760
0.161616E+07	0.653595E-01	0.646465E+07	252.389
0.171717E+07	0.129196	0.656566E+07	259.921
0.181818E+07	0.236571	0.666667E+07	267.041
0.191919E+07	0.406176	0.676768E+07	274.038
0.202020E+07	0.660166	0.686869E+07	280.798
0.212121E+07	1.02366	0.696970E+07	287.312
0.222222E+07	1.52400	0.707071E+07	293.571
0.232323E+07	2.19001	0.717172E+07	299.566
0.242424E+07	3.05097	0.727273E+07	305.290
0.252525E+07	4.13584	0.737374E+07	310.738
0.262626E+07	5.47251	0.747475E+07	315.902
0.272727E+07	7.08676	0.757576E+07	320.781
0.282828E+07	9.00254	0.767677E+07	325.369
0.292929E+07	11.2405	0.777778E+07	329.665
0.303030E+07	13.8182	0.787879E+07	333.667
0.313131E+07	16.7498	0.797980E+07	337.375
0.323232E+07	20.0461	0.808081E+07	340.788
0.333333E+07	23.7140	0.818182E+07	343.907
0.343434E+07	27.7573	0.828283E+07	346.734
0.353535E+07	32.1761	0.838384E+07	349.271
0.363636E+07	36.9675	0.848485E+07	351.521
0.373737E+07	42.1254	0.858586E+07	353.487
0.383838E+07	47.6409	0.868687E+07	355.173
0.393939E+07	53.5025	0.878788E+07	356.583
0.404040E+07	59.6965	0.888889E+07	357.723
0.414141E+07	66.2069	0.898990E+07	358.597
0.424242E+07	73.0159	0.909091E+07	359.212
0.434343E+07	80.1040	0.919192E+07	359.572
0.444444E+07	87.4506	0.929293E+07	359.685
0.454545E+07	95.0336	0.939394E+07	359.557
0.464646E+07	102.830	0.949495E+07	359.194
0.474747E+07	110.816	0.959596E+07	358.605
0.484848E+07	118.968	0.969697E+07	357.795
0.494949E+07	127.261	0.979798E+07	356.773
0.505050E+07	135.670	0.989899E+07	355.545
0.515151E+07	144.170	0.100000E+08	354.120

Woodward-Clyde

3 8 1635

OLD PLANT (CPC) LANDFILL AREA

**PESTAN RUNS
WITH DECAY**

3 8 1631

PESTAN
version 4.0, 1992.

Developed by :

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Title: W/DECAY BENZENE LANDFILL PLBEN1.INP

Solubility (mg/l): 0.17910E+04
Recharge rate (cm/hr).....: 0.65800E-03
Sorption constant (cc/g)....: 0.70000E+00
Saturated water content: 0.40000E+00
Solid-phase decay (/hr): 0.00000E+00
Liquid-phase decay (/hr): 0.36000E-04 ✓
Curve coefficient: 0.50000E+01
Bulk density (g/cc).....: 0.15900E+01
Dispersion coefficient (cm^2/hr)....: 0.18200E+00
Saturated hydraulic conductivity: 0.36000E+00
Minimum depth (cm).....: 0.00000E+00
Maximum depth (cm).....: 0.68300E+03
Minimum time (day).....: 0.00000E+00
Maximum time (day).....: 0.50000E+06

For application 1 the active ingredient (ai) applied is 0.520E+05 kg ai/ha,
and has been applied 0.100E+01 days prior to recharge ✓

+++++
Results

Projected water content: 0.246E+00
Pore water velocity [cm/hr]: 0.267E-02
Pollutant velocity [cm/hr]: 0.484E-03
Length of pollutant slug [cm]: 0.214E+03
Mass decayed prior to recharge [kg]: 0.000E+00

DAYS	UG/L		
0.100000E-29	0.000000		
5050.50	0.000000		
10101.0	1.41644		
15151.5	88.4368		
20202.0	453.354	262626.	0.741142E-15
25252.5	838.205	267677.	0.272522E-15
30303.0	918.799	272727.	0.100171E-15
35353.5	741.680	277778.	0.368064E-16
40404.0	492.580	282828.	0.135190E-16
45454.5	286.642	287879.	0.496335E-17
50505.0	151.891	292929.	0.182181E-17
55555.6	75.1408	297980.	0.668920E-18
60606.1	35.2930	303030.	0.245356E-18
65656.6	15.9255	308081.	0.900425E-19
70707.1	6.96273	313131.	0.329899E-19
75757.6	2.96810	318182.	0.120997E-19
80808.1	1.23949	323232.	0.443774E-20
85858.6	0.508931	328283.	0.162353E-20
90909.1	0.206042	333333.	0.595826E-21
95959.6	0.824346E-01	338384.	0.218616E-21
101010.	0.326516E-01	343434.	0.800401E-22
106061.	0.128225E-01	348485.	0.293673E-22
111111.	0.499848E-02	353535.	0.107148E-22
116162.	0.193609E-02	358586.	0.394576E-23
121212.	0.745745E-03	363636.	0.143574E-23
126263.	0.285849E-03	368687.	0.527373E-24
131313.	0.109098E-03	373737.	0.193434E-24
136364.	0.414803E-04	378788.	0.707526E-25
141414.	0.157182E-04	383838.	0.261001E-25
146465.	0.593818E-05	388889.	0.950911E-26
151515.	0.223735E-05	393939.	0.343273E-26
156566.	0.840936E-06	398990.	0.171662E-26
161616.	0.315388E-06	404040.	0.615626E-27
166667.	0.118051E-06	409091.	0.229946E-27
171717.	0.441082E-07	414141.	0.819449E-28
176768.	0.164538E-07	419192.	0.304091E-28
181818.	0.612870E-08	424242.	0.107273E-28
186869.	0.227975E-08	429293.	0.000000
191919.	0.846967E-09	434343.	0.000000
196970.	0.314310E-09	439394.	0.000000
202020.	0.116518E-09	444444.	0.000000
207071.	0.431540E-10	449495.	0.000000
212121.	0.159684E-10	454545.	0.000000
217172.	0.590403E-11	459596.	0.000000
222222.	0.218124E-11	464646.	0.000000
227273.	0.805307E-12	469697.	0.000000
232323.	0.297130E-12	474747.	0.000000
237374.	0.109562E-12	479798.	0.000000
242424.	0.403757E-13	484848.	0.000000
247475.	0.148720E-13	489899.	0.000000
252525.	0.547552E-14	494949.	0.000000
257576.	0.201482E-14	500000.	0.000000

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Title: W/DECAY CHLOROBENZENE LANDFILL PLCHB1

Solubility (mg/l): 0.47170E+03
Recharge rate (cm/hr).....: 0.65800E-03
Sorption constant (cc/g)....: 0.18800E+01
Saturated water content: 0.40000E+00
Solid-phase decay (/hr): 0.00000E+00
Liquid-phase decay (/hr): 0.32000E-05 ✓
Curve coefficient: 0.50000E+01
Bulk density (g/cc).....: 0.15900E+01
Dispersion coefficient (cm^2/hr)....: 0.18200E+00
Saturated hydraulic conductivity: 0.36000E+00
Minimum depth (cm).....: 0.00000E+00
Maximum depth (cm).....: 0.68300E+03
Minimum time (day).....: 0.00000E+00
Maximum time (day).....: 0.40000E+06

For application 1 the active ingredient (ai) applied is 0.930E+04 kg ai/ha,
and has been applied 0.100E+01 days prior to recharge

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Results

Projected water content: 0.246E+00
Pore water velocity [cm/hr]: 0.267E-02
Pollutant velocity [cm/hr]: 0.203E-03
Length of pollutant slug [cm]: 0.609E+02
Mass decayed prior to recharge [kg]: 0.000E+00

W/DECAY CHLOROBENZENE LANDFILL PLCHB1

3 8 1630

DAYS	UG/L		
0.10000E-29	0.000000		
4040.40	0.000000		
8080.81	0.000000		
12121.2	0.000000		
16161.6	0.000000	210101.	6338.11
20202.0	0.000000	214141.	5903.37
24242.4	1.61043	218182.	5492.43
28282.8	12.1656	222222.	5104.82
32323.2	53.9852	226263.	4739.95
36363.6	167.984	230303.	4397.10
40404.0	407.503	234343.	4075.50
44444.4	824.645	238384.	3774.32
48484.8	1456.66	242424.	3492.66
52525.3	2317.57	246465.	3229.64
56565.7	3396.61	250505.	2984.34
60606.1	4661.79	254545.	2755.82
64646.5	6066.36	258586.	2543.19
68686.9	7555.73	262626.	2345.56
72727.3	9073.89	266667.	2162.04
76767.7	10568.2	270707.	1991.80
80808.1	11992.6	274747.	1834.01
84848.5	13309.7	278788.	1687.88
88888.9	14490.8	282828.	1552.66
92929.3	15516.4	286869.	1427.63
96969.7	16374.9	290909.	1312.10
101010.	17061.8	294950.	1205.42
105051.	17578.5	298990.	1106.98
109091.	17930.9	303030.	1016.20
113131.	18128.3	307071.	932.520
117172.	18182.6	311111.	855.437
121212.	18107.3	315152.	784.463
125253.	17916.6	319192.	719.153
129293.	17625.0	323232.	659.076
133333.	17246.9	327273.	603.844
137374.	16796.1	331313.	553.083
141414.	16285.8	335354.	506.452
145455.	15727.8	339394.	463.630
149495.	15133.4	343434.	424.327
153535.	14512.4	347475.	388.260
157576.	13873.8	351515.	355.176
161616.	13225.5	355556.	324.840
165657.	12574.1	359596.	297.030
169697.	11925.6	363636.	271.545
173737.	11284.9	367677.	248.198
177778.	10656.1	371717.	226.815
181818.	10042.5	375758.	207.237
185859.	9446.98	379798.	189.312
189899.	8871.58	383838.	172.911
193939.	8317.91	387879.	157.903
197980.	7787.13	391919.	144.174
202020.	7280.01	395960.	131.619
206061.	6796.95	400000.	120.139

3 8 1647

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Title: WITH DECAY 1,2 dichlorobenzene. LANDFILL PL1201

Solubility (mg/l): 0.15600E+03
Recharge rate (cm/hr).....: 0.65800E-03
Sorption constant (cc/g)....: 0.86100E+01
Saturated water content: 0.40000E+00
Solid-phase decay (/hr): 0.00000E+00
Liquid-phase decay (/hr): 0.32000E-05
Curve coefficient: 0.50000E+01
Bulk density (g/cc).....: 0.15900E+01
Dispersion coefficient (cm^2/hr)....: 0.18200E+00
Saturated hydraulic conductivity: 0.36000E+00
Minimum depth (cm).....: 0.00000E+00
Maximum depth (cm).....: 0.68300E+03
Minimum time (day).....: 0.00000E+00
Maximum time (day).....: 0.10000E+07

For application 1 the active ingredient (ai) applied is 0.100E+09 kg ai/ha,
and has been applied 0.100E+01 days prior to recharge

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Results

Projected water content: 0.246E+00
Pore water velocity [cm/hr]: 0.267E-02
Pollutant velocity [cm/hr]: 0.472E-04
Length of pollutant slug [cm]: 0.460E+06
Mass decayed prior to recharge [kg]: 0.000E+00

WITH DECAY 1,2 DICHLORO LANDFILL PL12D1

DAYS	UG/L		
0.100000E-29	0.000000		
10101.0	0.000000		
20202.0	0.000000		
30303.0	0.000000		
40404.0	0.000000	525253.	28977.5
50505.0	0.000000	535354.	29817.1
60606.1	0.000000	545455.	30618.5
70707.1	0.000000	555556.	31381.1
80808.1	0.000000	565657.	32104.4
90909.1	0.657520E-01	575758.	32788.2
101010.	0.360766	585859.	33432.3
111111.	1.411142	595960.	34036.9
121212.	4.39746	606061.	34602.2
131313.	11.4606	616162.	35128.6
141414.	25.9705	626263.	35616.6
151515.	52.6152	636364.	36066.8
161616.	97.3164	646465.	36479.9
171717.	166.970	656566.	36856.7
181818.	269.073	666667.	37197.9
191919.	411.285	676768.	37504.6
202020.	601.004	686869.	37777.7
212121.	844.986	696970.	38018.2
222222.	1149.01	707071.	38227.0
232323.	1517.69	717172.	38405.3
242424.	1954.31	727273.	38554.0
252525.	2460.77	737374.	38674.4
262626.	3037.60	747475.	38767.4
272727.	3684.06	757576.	38834.1
282828.	4398.19	767677.	38875.6
292929.	5177.01	777778.	38893.0 ✓
303030.	6016.61	787879.	38887.4
313131.	6912.38	797980.	38859.7
323232.	7859.08	808081.	38811.1
333333.	8851.08	818182.	38742.4
343434.	9882.46	828283.	38654.7
353535.	10947.1	838384.	38549.0
363636.	12038.8	848485.	38426.3
373737.	13151.6	858586.	38287.3
383838.	14279.3	868687.	38133.0
393939.	15416.3	878788.	37964.3
404040.	16557.1	888889.	37782.1
414141.	17696.3	898990.	37587.0
424242.	18829.0	909091.	37380.0
434343.	19950.8	919192.	37161.7
444444.	21057.3	929293.	36932.9
454545.	22144.8	939394.	36694.3
464646.	23209.8	949495.	36446.5
474747.	24249.2	959596.	36190.3
484848.	25260.2	969697.	35926.2
494949.	26240.4	979798.	35654.8
505051.	27187.9	989899.	35376.7
515152.	28100.7	0.100000E+07	35092.5

3 8 164

3 8 1642

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Title: W/DECAY 1,3 dichlorobenzene. LANDFILL PL1301

Solubility (mg/l): 0.11100E+03
Recharge rate (cm/hr).....: 0.65800E-03
Sorption constant (cc/g)....: 0.64600E+01
Saturated water content: 0.40000E+00
Solid-phase decay (/hr): 0.00000E+00
Liquid-phase decay (/hr): 0.32000E-05 ✓
Curve coefficient: 0.50000E+01
Bulk density (g/cc).....: 0.15900E+01
Dispersion coefficient (cm^2/hr)....: 0.18200E+00
Saturated hydraulic conductivity: 0.36000E+00
Minimum depth (cm).....: 0.00000E+00
Maximum depth (cm).....: 0.68300E+03
Minimum time (day).....: 0.00000E+00
Maximum time (day).....: 0.13000E+07

For application 1 the active ingredient (ai) applied is 0.100E+09 kg ai/ha,
and has been applied 0.100E+01 days prior to recharge

Results

Projected water content: 0.246E+00
Pore water velocity [cm/hr]: 0.267E-02
Pollutant velocity [cm/hr]: 0.626E-04
Length of pollutant slug [cm]: 0.857E+06
Mass decayed prior to recharge [kg]: 0.000E+00

W/DECAY 1,3 DICHLORO LANDFILL PL13D1

3 8 1640

DAYS	UG/L		
0.100000E-29	0.000000		
13131.3	0.000000		
26262.6	0.000000		
39393.9	0.000000		
52525.3	0.000000	682828.	26661.4
65656.6	0.000000	695960.	26394.8
78787.9	0.416300	709091.	26106.5
91919.2	3.32277	722222.	25798.9
105051.	15.5990	735354.	25474.3
118182.	51.5302	748485.	25135.0
131313.	132.966	761616.	24782.8
144444.	286.575	774748.	24419.7
157576.	539.482	787879.	24047.4
170707.	914.999	801010.	23667.5
183838.	1429.61	814141.	23281.3
196970.	2091.48	827273.	22890.3
210101.	2900.35	840404.	22495.6
223232.	3848.47	853535.	22098.4
236364.	4922.07	866667.	21699.6
249495.	6103.01	879798.	21300.2
262626.	7370.44	892929.	20901.0
275758.	8702.23	906061.	20502.7
288889.	10076.2	919192.	20106.0
302020.	11471.0	932323.	19711.5
315152.	12866.9	945455.	19319.8
328283.	14245.9	958586.	18931.3
341414.	15592.4	971717.	18546.4
354545.	16893.0	984849.	18165.6
367677.	18136.6	997980.	17789.1
380808.	19314.3	0.101111E+07	17417.2
393939.	20419.3	0.102424E+07	17050.2
407071.	21446.5	0.103737E+07	16688.3
420202.	22392.6	0.105051E+07	16331.7
433333.	23255.8	0.106364E+07	15980.5
446465.	24035.3	0.107677E+07	15634.8
459596.	24731.7	0.108990E+07	15294.8
472727.	25346.3	0.110303E+07	14960.6
485859.	25881.1	0.111616E+07	14632.1
498990.	26338.8	0.112929E+07	14309.4
512121.	26722.5	0.114242E+07	13992.6
525253.	27035.5	0.115556E+07	13681.6
538384.	27281.6	0.116869E+07	13376.5
551515.	27464.6	0.118182E+07	13077.3
564647.	27588.3	0.119495E+07	12783.9
577778.	27656.8	0.120808E+07	12496.2
590909.	27673.8	0.122121E+07	12214.4
604040.	27643.3	0.123434E+07	11938.2
617172.	27569.0	0.124747E+07	11667.7
630303.	27454.4	0.126061E+07	11402.7
643434.	27303.2	0.127374E+07	11143.3
656566.	27118.5	0.128687E+07	10889.3
669697.	26903.6	0.130000E+07	10640.7

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Title: W/DECAY, 1,4 dichlorobenzene. LANDFILL PL1401

Solubility (mg/l): 0.87000E+02
Recharge rate (cm/hr).....: 0.65800E-03
Sorption constant (cc/g).....: 0.43100E+01
Saturated water content: 0.40000E+00
Solid-phase decay (/hr): 0.00000E+00
Liquid-phase decay (/hr): 0.32000E-05 ✓
Curve coefficient: 0.50000E+01
Bulk density (g/cc).....: 0.15900E+01
Dispersion coefficient (cm^2/hr)....: 0.18200E+00
Saturated hydraulic conductivity: 0.36000E+00
Minimum depth (cm).....: 0.00000E+00
Maximum depth (cm).....: 0.68300E+03
Minimum time (day).....: 0.00000E+00
Maximum time (day).....: 0.4C9CC+E+0_

For application 1 the active ingredient (ai) applied is 0.200E+05 kg ai/ha,
and has been applied 0.100E+01 days prior to recharge

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Results

Projected water content: 0.246E+00
Pore water velocity [cm/hr]: 0.267E-02
Pollutant velocity [cm/hr]: 0.927E-04
Length of pollutant slug [cm]: 0.324E+03
Mass decayed prior to recharge [kg]: 0.000E+00

4040.40	0.000000	16161.6	0.000000	20202.0	8080.81	12121.2	0.000000	12020.0	0.000000	206061.
4040.40	0.000000	210101.	8953.87	214141.	9341.92	24242.4	0.000000	28282.8	0.000000	32323.2
4040.40	0.000000	210101.	8953.87	214141.	9341.92	24242.4	0.000000	28282.8	0.000000	32323.2
36363.6	0.000000	10762.1	10429.1	226263.	222222.	10080.7	9717.96	218182.	9717.96	218182.
36363.6	0.000000	10762.1	10429.1	226263.	222222.	10080.7	9717.96	218182.	9717.96	218182.
32525.3	0.272758	0.780521	1.93923	1.93923	0.797508E-01	4.28873	64664.5	68686.9	8.62381	72727.3
32525.3	0.272758	0.780521	1.93923	1.93923	0.797508E-01	4.28873	64664.5	68686.9	8.62381	72727.3
56565.7	0.780521	11924.7	12170.1	250505.	250505.	16.0163	262626.	12792.9	12962.4	262626.
56565.7	0.780521	11924.7	12170.1	250505.	250505.	16.0163	262626.	12792.9	12962.4	262626.
60606.1	1.93923	11924.7	12170.1	254545.	12396.8	12396.8	258586.	12604.4	12604.4	258586.
60606.1	1.93923	11924.7	12170.1	254545.	12396.8	12396.8	258586.	12604.4	12604.4	258586.
76767.7	27.8182	270707.	13112.8	274767.	13244.4	13244.4	274767.	13244.4	13244.4	274767.
76767.7	27.8182	270707.	13112.8	274767.	13244.4	13244.4	274767.	13244.4	13244.4	274767.
80808.1	45.6393	307071.	13658.9	278788.	13357.6	13357.6	278788.	106.765	793.769	113131.
80808.1	45.6393	307071.	13658.9	278788.	13357.6	13357.6	278788.	106.765	793.769	113131.
92929.3	156.099	319192.	13558.0	286869.	13528.8	13528.8	286869.	13558.0	1402.69	129293.
92929.3	156.099	319192.	13558.0	286869.	13528.8	13528.8	286869.	13558.0	1402.69	129293.
96969.7	215.351	319192.	13558.0	290909.	13588.0	13588.0	290909.	1176.31	1176.31	125253.
96969.7	215.351	319192.	13558.0	290909.	13588.0	13588.0	290909.	1176.31	1176.31	125253.
101010.	292.506	294950.	13630.1	294950.	13630.1	13630.1	294950.	1651.81	1651.81	133333.
101010.	292.506	294950.	13630.1	294950.	13630.1	13630.1	294950.	1651.81	1651.81	133333.
105051.	387.607	298990.	13655.6	298990.	13655.6	13655.6	298990.	793.769	793.769	113131.
105051.	387.607	298990.	13655.6	298990.	13655.6	13655.6	298990.	793.769	793.769	113131.
121212.	973.651	315152.	13602.5	315152.	13602.5	13602.5	315152.	1923.79	1923.79	133333.
121212.	973.651	315152.	13602.5	315152.	13602.5	13602.5	315152.	1923.79	1923.79	133333.
125253.	2217.63	3218.67	13232.6	3218.67	13232.6	13232.6	3218.67	2217.63	2217.63	141414.
125253.	2217.63	3218.67	13232.6	3218.67	13232.6	13232.6	3218.67	2217.63	2217.63	141414.
144455.	2532.29	3218.67	13232.6	3218.67	13232.6	13232.6	3218.67	2532.29	2532.29	145455.
144455.	2532.29	3218.67	13232.6	3218.67	13232.6	13232.6	3218.67	2532.29	2532.29	145455.
149455.	2866.47	3339394.	13124.4	343434.	13124.4	13124.4	3339394.	2866.47	2866.47	149455.
149455.	2866.47	3339394.	13124.4	343434.	13124.4	13124.4	3339394.	2866.47	2866.47	149455.
153535.	3218.67	347475.	12879.2	347475.	12879.2	12879.2	347475.	3218.67	3218.67	153535.
153535.	3218.67	347475.	12879.2	347475.	12879.2	12879.2	347475.	3218.67	3218.67	153535.
157576.	3587.20	351515.	12743.3	351515.	12743.3	12743.3	351515.	3587.20	3587.20	157576.
157576.	3587.20	351515.	12743.3	351515.	12743.3	12743.3	351515.	3587.20	3587.20	157576.
161616.	3970.23	355556.	12599.6	355556.	12599.6	12599.6	355556.	3970.23	3970.23	161616.
161616.	3970.23	355556.	12599.6	355556.	12599.6	12599.6	355556.	3970.23	3970.23	161616.
165657.	4365.80	359596.	12448.2	359596.	12448.2	12448.2	359596.	4365.80	4365.80	165657.
165657.	4365.80	359596.	12448.2	359596.	12448.2	12448.2	359596.	4365.80	4365.80	165657.
169697.	4771.87	367677.	12125.7	367677.	12125.7	12125.7	367677.	4771.87	4771.87	169697.
169697.	4771.87	367677.	12125.7	367677.	12125.7	12125.7	367677.	4771.87	4771.87	169697.
173737.	5186.36	37177.	11955.6	37177.	11955.6	11955.6	37177.	5186.36	5186.36	173737.
173737.	5186.36	37177.	11955.6	37177.	11955.6	11955.6	37177.	5186.36	5186.36	173737.
177778.	5607.13	379798.	11780.4	379798.	11780.4	11780.4	379798.	5607.13	5607.13	177778.
177778.	5607.13	379798.	11780.4	379798.	11780.4	11780.4	379798.	5607.13	5607.13	177778.
181818.	6032.07	375758.	11780.4	375758.	11780.4	11780.4	375758.	6032.07	6032.07	181818.
181818.	6032.07	375758.	11780.4	375758.	11780.4	11780.4	375758.	6032.07	6032.07	181818.
185859.	6459.06	379798.	11780.4	379798.	11780.4	11780.4	379798.	6459.06	6459.06	185859.
185859.	6459.06	379798.	11780.4	379798.	11780.4	11780.4	379798.	6459.06	6459.06	185859.
189899.	6886.06	383838.	11616.6	383838.	11616.6	11616.6	383838.	6886.06	6886.06	189899.
189899.	6886.06	383838.	11616.6	383838.	11616.6	11616.6	383838.	6886.06	6886.06	189899.
193939.	7311.05	38717.	11416.6	38717.	11416.6	11416.6	38717.	7311.05	7311.05	193939.
193939.	7311.05	38717.	11416.6	38717.	11416.6	11416.6	38717.	7311.05	7311.05	193939.
197980.	7732.11	391919.	11038.2	391919.	11038.2	11038.2	391919.	7732.11	7732.11	197980.
197980.	7732.11	391919.	11038.2	391919.	11038.2	11038.2	391919.	7732.11	7732.11	197980.
202020.	8147.40	395960.	10844.6	395960.	10844.6	10844.6	395960.	8147.40	8147.40	202020.
202020.	8147.40	395960.	10844.6	395960.	10844.6	10844.6	395960.	8147.40	8147.40	202020.

3 8 1646

PESTAN
version 4.0, 1992.

Developed by :

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Ada, OK 74820

Title: W/DECAY 1,2,4-Trichlorobenzene. LANDFILL PL1241

Solubility (mg/l): 0.48800E+02
Recharge rate (cm/hr).....: 0.65800E-03
Sorption constant (cc/g)....: 0.48690E+02
Saturated water content: 0.40000E+00
Solid-phase decay (/hr): 0.00000E+00
Liquid-phase decay (/hr): 0.32000E-05
Curve coefficient: 0.50000E+01
Bulk density (g/cc).....: 0.15900E+01
Dispersion coefficient (cm^2/hr)....: 0.18200E+00
Saturated hydraulic conductivity: 0.36000E+00
Minimum depth (cm).....: 0.00000E+00
Maximum depth (cm).....: 0.68300E+03
Minimum time (day).....: 0.00000E+00
Maximum time (day).....: 0.13000E+08

For application 1 the active ingredient (ai) applied is 0.100E+09 kg ai/ha,
and has been applied 0.100E+01 days prior to recharge

++++++

Results

Projected water content: 0.246E+00
Pore water velocity [cm/hr]: 0.267E-02
Pollutant velocity [cm/hr]: 0.847E-05
Length of pollutant slug [cm]: 0.264E+06
Mass decayed prior to recharge [kg]: 0.000E+00

DAYS	UG/L		
0.100000E-29	0.000000		
131313.	0.000000		
262626.	0.000000		
393939.	0.000000		
525253.	0.383914E-01	0.682828E+07	8766.11
656566.	0.960563	0.695960E+07	8532.20
787879.	8.10287	0.709091E+07	8300.80
919192.	36.6453	0.722222E+07	8072.38
0.105050E+07	112.077	0.735353E+07	7847.32
0.118182E+07	263.891	0.748485E+07	7625.97
0.131313E+07	517.138	0.761616E+07	7408.58
0.144444E+07	886.485	0.774747E+07	7195.38
0.157576E+07	1374.25	0.787879E+07	6986.53
0.170707E+07	1971.60	0.801010E+07	6782.19
0.183838E+07	2661.41	0.814141E+07	6582.43
0.196970E+07	3421.59	0.827273E+07	6387.34
0.210101E+07	4228.04	0.840404E+07	6196.95
0.223232E+07	5056.97	0.853535E+07	6011.29
0.236364E+07	5886.49	0.866667E+07	5830.36
0.249495E+07	6697.58	0.879798E+07	5654.13
0.262626E+07	7474.52	0.892929E+07	5482.58
0.275758E+07	8204.95	0.906061E+07	5315.66
0.288889E+07	8879.73	0.919192E+07	5153.32
0.302020E+07	9492.62	0.932323E+07	4995.49
0.315151E+07	10039.9	0.945454E+07	4842.10
0.328283E+07	10520.0	0.958586E+07	4693.08
0.341414E+07	10933.0	0.971717E+07	4548.35
0.354545E+07	11280.4	0.984848E+07	4407.80
0.367677E+07	11564.6	0.997980E+07	4271.37
0.380808E+07	11788.9	0.101111E+08	4138.95
0.393939E+07	11957.2	0.102424E+08	4010.46
0.407071E+07	12073.3	0.103737E+08	3885.79
0.420202E+07	12141.7	0.105050E+08	3764.86
0.433333E+07	12166.5 ✓	0.106364E+08	3647.57
0.446465E+07	12152.0	0.107677E+08	3533.82
0.459596E+07	12102.3	0.108990E+08	3423.53
0.472727E+07	12021.4	0.110303E+08	3316.59
0.485859E+07	11912.8	0.111616E+08	3212.92
0.498990E+07	11780.1	0.112929E+08	3112.43
0.512121E+07	11626.5	0.114242E+08	3015.02
0.525252E+07	11454.9	0.115556E+08	2920.61
0.538384E+07	11268.2	0.116869E+08	2829.11
0.551515E+07	11068.7	0.118182E+08	2740.44
0.564646E+07	10858.6	0.119495E+08	2654.51
0.577778E+07	10640.1	0.120808E+08	2571.25
0.590909E+07	10414.9	0.122121E+08	2490.58
0.604040E+07	10184.7	0.123434E+08	2412.41
0.617172E+07	9950.76	0.124747E+08	2336.68
0.630303E+07	9714.49	0.126061E+08	2263.30
0.643434E+07	9476.98	0.127374E+08	2192.21
0.656566E+07	9239.19	0.128687E+08	2123.35
0.669697E+07	9001.99	0.130000E+08	2056.63

Woodward-Clyde

3 8 1648

FORMER CPC PLANT AREA

**PESTAN RUNS
NO DECAY**

PESTAN
version 4.0, 1992.

3 8 1640

Developed by :

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Ada, OK 74820

Title: BASE CASE, BENZENE PLANT AREA FILE= PPBENB.INP

Solubility (mg/l): 0.17910E+04
Recharge rate (cm/hr).....: 0.92800E-03
Sorption constant (cc/g)....: 0.70000E+00
Saturated water content: 0.35000E+00
Solid-phase decay (/hr): 0.00000E+00
Liquid-phase decay (/hr): 0.00000E+00
Curve coefficient: 0.40000E+01
Bulk density (g/cc).....: 0.17200E+01
Dispersion coefficient (cm²/hr)....: 0.38500E+00
Saturated hydraulic conductivity: 0.38100E+02
Minimum depth (cm).....: 0.00000E+00
Maximum depth (cm).....: 0.55000E+03
Minimum time (day).....: 0.00000E+00
Maximum time (day).....: 0.10000E+06

For application 1 the active ingredient (ai) applied is 0.230E+02 kg ai/ha,
and has been applied 0.100E+01 days prior to recharge

++++++

Results

Projected water content: 0.133E+00
Pore water velocity [cm/hr]: 0.696E-02
Pollutant velocity [cm/hr]: 0.694E-03
Length of pollutant slug [cm]: 0.960E-01
Mass decayed prior to recharge [kg]: 0.000E+00

BASE CASE, BENZENE, PLANT AREA FILE = PPBENB

3 8 165

DAYS	UG/L		
0.100000E-29	0.000000		
1010.10	0.000000		
2020.20	0.000000		
3030.30	0.000000		
4040.40	0.000000	52525.3	127.889
5050.50	0.000000	53535.4	120.950
6060.61	0.106752	54545.5	114.220
7070.71	0.480384	55555.6	107.819
8080.81	1.70803	56565.7	101.628
9090.91	4.64371	57575.8	95.8098
10101.0	9.98130	58585.9	90.1520
11111.1	18.5215	59596.0	84.9212
12121.2	30.4243	60606.1	79.8504
13131.3	45.5297	61616.2	75.0466
14141.4	63.6241	62626.3	70.4029
15151.5	83.9070	63636.4	66.1328
16161.6	105.631	64646.5	62.0762
17171.7	128.156	65656.6	58.1798
18181.8	150.520	66666.7	54.6036
19191.9	172.298	67676.8	51.0808
20202.0	192.634	68686.9	47.8249
21212.1	211.582	69697.0	44.7291
22222.2	228.396	70707.1	41.9535
23232.3	243.021	71717.2	39.1780
24242.4	255.564	72727.3	36.6693
25252.5	265.732	73737.4	34.2674
26262.6	273.659	74747.5	32.0256
27272.7	279.450	75757.6	29.8905
28282.8	283.186	76767.7	27.9156
29292.9	285.041	77777.8	26.1008
30303.0	285.161	78787.9	24.3394
31313.1	285.733	79798.0	22.7382
32323.2	280.931	80808.1	21.1903
33333.3	276.896	81818.2	19.7491
34343.4	271.817	82928.3	18.4147
35353.5	265.839	83838.4	17.1871
36363.6	259.100	84848.5	16.0128
37373.7	251.761	85858.6	14.8919
38383.8	243.955	86868.7	13.9311
39393.9	235.762	87878.8	12.9704
40404.0	227.302	88888.9	12.0630
41414.1	218.601	89899.0	11.2090
42424.2	209.874	90909.1	10.4617
43434.3	201.067	91919.2	9.71442
44444.4	192.287	92929.3	9.07391
45454.5	183.613	93939.4	8.38003
46464.6	175.020	94949.5	7.84627
47474.7	166.640	95959.6	7.25913
48484.8	158.420	96969.7	6.77875
49494.9	150.413	97979.8	6.29836
50505.1	142.674	98989.9	5.87136
51515.2	135.148	100000.	5.44435

3 8 1650.1

PESTAN
version 4.0, 1992.

Developed by :

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Ada, OK 74820

Title: BASE CASE, CHLOROBENZENE PLANT AREA. FILE PPCHBB.INP

Solubility (mg/l): 0.47170E+03
Recharge rate (cm/hr).....: 0.92800E-03
Sorption constant (cc/g)....: 0.18800E+01
Saturated water content: 0.35000E+00
Solid-phase decay (/hr): 0.00000E+00
Liquid-phase decay (/hr): 0.00000E+00 ✓
Curve coefficient: 0.40000E+01
Bulk density (g/cc).....: 0.17200E+01
Dispersion coefficient (cm^2/hr)....: 0.38500E+00
Saturated hydraulic conductivity: 0.38100E+02
Minimum depth (cm).....: 0.00000E+00
Maximum depth (cm).....: 0.55000E+03
Minimum time (day).....: 0.00000E+00
Maximum time (day).....: 0.10000E+06

For application 1 the active ingredient (ai) applied is 0.115E+04 kg ai/ha,
and has been applied 0.100E+01 days prior to recharge

+++++

Results

Projected water content: 0.133E+00
Pore water velocity [cm/hr]: 0.696E-02
Pollutant velocity [cm/hr]: 0.276E-03
Length of pollutant slug [cm]: 0.724E+01
Mass decayed prior to recharge [kg]: 0.000E+00

1651 3 8

DAYS UG/L

0.10000E-29 0.000000

1010.10 0.000000

2020.20 0.000000

3030.30 0.000000

4040.40 0.000000

5050.50 0.000000

6060.61 0.000000

7070.71 0.000000

8080.81 0.000000

9090.91 0.000000

10101.0 0.000000

11111.1 0.000000

12121.2 0.000000

13131.3 0.154635

16161.6 1.5151.5

17171.7 5.46847

22222.2 66.1417

21212.1 44.5490

20202.0 69697.0

19191.9 5548.62

18181.8 5548.62

10.1638 69697.0

175.609 44.5490

24242.4 69697.0

23232.3 5548.62

368.594 5548.62

28282.8 5548.62

76767.7 5548.62

5644.07 5548.62

10313.11 5548.62

34343.4 5548.62

33333.3 5548.62

30303.0 5548.62

31313.1 5548.62

655.176 5548.62

7978.0 5548.62

5608.28 5548.62

78787.9 5548.62

5636.70 5548.62

1173.74 5548.62

35353.5 5548.62

36363.6 5548.62

1323.79 5548.62

1642.56 5548.62

37373.7 5548.62

1480.37 5548.62

1809.39 5548.62

8787.8 5548.62

86868.7 5548.62

5667.25 5548.62

85858.6 5548.62

1173.74 5548.62

1323.79 5548.62

1642.56 5548.62

38383.8 5548.62

83838.4 5548.62

5534.65 5548.62

82828.3 5548.62

10313.11 5548.62

81818.2 5548.62

896.660 5548.62

32323.2 5548.62

771.152 5548.62

655.176 5548.62

7978.0 5548.62

5624.70 5548.62

78787.9 5548.62

5636.70 5548.62

1173.74 5548.62

1323.79 5548.62

1642.56 5548.62

38383.8 5548.62

83838.4 5548.62

5534.65 5548.62

82828.3 5548.62

10313.11 5548.62

81818.2 5548.62

896.660 5548.62

32323.2 5548.62

771.152 5548.62

655.176 5548.62

7978.0 5548.62

5624.70 5548.62

1173.74 5548.62

1323.79 5548.62

1642.56 5548.62

38383.8 5548.62

PESTAN
version 4.0, 1992.

3 8 1652

Developed by :

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Ada, OK 74820

Title: BASE CASE, 1,2-DICHLOROBENZENE PLANT AREA FILE = PP12DB.INP

Solubility (mg/l): 0.15600E+05
Recharge rate (cm/hr).....: 0.92800E-03
Sorption constant (cc/g).....: 0.86100E+01
Saturated water content: 0.35000E+00
Solid-phase decay (/hr): 0.00000E+00
Liquid-phase decay (/hr): 0.00000E+00 ✓
Curve coefficient: 0.40000E+01
Bulk density (g/cc).....: 0.17200E+01
Dispersion coefficient (cm^2/hr).....: 0.38500E+00
Saturated hydraulic conductivity: 0.38100E+02
Minimum depth (cm).....: 0.00000E+00
Maximum depth (cm).....: 0.55000E+03
Minimum time (day).....: 0.00000E+00
Maximum time (day).....: 0.55000E+06

For application 1 the active ingredient (ai) applied is 0.322E+05 kg ai/ha,
and has been applied 0.100E+01 days prior to recharge

+++++
Results

Projected water content: 0.133E+00
Pore water velocity [cm/hr]: 0.696E-02
Pollutant velocity [cm/hr]: 0.621E-04
Length of pollutant slug [cm]: 0.138E+03
Mass decayed prior to recharge [kg]: 0.000E+00

DAYS	ug/l		
0.100000E-29	0.000000		
5555.56	0.000000		
11111.1	0.000000		
16666.7	0.000000		
22222.2	0.000000		
27777.8	0.000000	288889.	27014.8
33333.3	0.000000	294444.	27776.8
38888.9	0.000000	300000.	28488.9
44444.4	0.000000	305556.	29150.0
50000.0	0.000000	311111.	29759.7
55555.6	0.836849E-01	316667.	30317.6
61111.1	0.376582	322222.	30823.7
66666.7	1.33896	327778.	31278.3
72222.2	3.91924	333333.	31681.9
77777.8	9.83763	338889.	32035.2
83333.3	21.7069	344444.	32339.2
88888.9	43.4557	350000.	32594.8
94444.4	80.0167	355556.	32803.4
100000.	137.415	361111.	32966.3
105556.	222.448	366667.	33084.8
111111.	342.406	372222.	33160.7
116667.	504.699	377778.	33195.4 ✓
122222.	716.459	383333.	33190.6
127778.	984.242	388889.	33148.1
133333.	1313.67	394444.	33069.6
138889.	1709.28	400000.	32956.8
144444.	2174.28	405556.	32811.6
150000.	2710.53	411111.	32635.6
155556.	3318.50	416667.	32430.7
161111.	3997.28	422222.	32198.6
166667.	4744.11	427778.	31941.0
172222.	5557.43	433333.	31659.5
177778.	6431.10	438889.	31355.9
183333.	7360.50	444444.	31031.7
188889.	8339.72	450000.	30688.6
194444.	9362.29	455556.	30327.9
200000.	10421.4	461111.	29951.3
205556.	11509.9	466667.	29560.1
211111.	12620.7	472222.	29155.7
216667.	13746.6	477778.	28739.5
222222.	14880.6	483333.	28312.6
227778.	16015.9	488889.	27876.4
233333.	17145.9	494444.	27431.9
238889.	18264.5	500000.	26980.4
244444.	19365.9	505556.	26522.8
250000.	20444.8	511111.	26060.1
255556.	21496.3	516667.	25593.3
261111.	22515.9	522222.	25123.4
266667.	23499.7	527778.	24651.1
272222.	24444.3	533333.	24177.2
277778.	25346.7	538889.	23702.6
283333.	26204.2	544444.	23227.9
		550000.	22753.8

PESTAN
version 4.0, 1992.

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Title: BASE CASE, 1,3-DICHLOROBENZENE PLANT AREA

Solubility (mg/l): 0.11100E+03
Recharge rate (cm/hr).....: 0.92800E-03
Sorption constant (cc/g).....: 0.64600E+01
Saturated water content: 0.35000E+00
Solid-phase decay (/hr): 0.00000E+00
Liquid-phase decay (/hr): 0.00000E+00 ✓
Curve coefficient: 0.40000E+01
Bulk density (g/cc).....: 0.17200E+01
Dispersion coefficient (cm^2/hr)....: 0.38500E+00
Saturated hydraulic conductivity: 0.38100E+02
Minimum depth (cm).....: 0.00000E+00
Maximum depth (cm).....: 0.55000E+03
Minimum time (day).....: 0.00000E+00
Maximum time (day).....: 0.55000E+06

For application 1 the active ingredient (ai) applied is 0.252E+05 kg ai/ha,
and has been applied 0.100E+01 days prior to recharge

Results

Projected water content: 0.133E+00 ✓
Pore water velocity [cm/hr]: 0.696E-02
Pollutant velocity [cm/hr]: 0.625E-04
Length of pollutant slug [cm]: 0.202E+03
Mass decayed prior to recharge [kg]: 0.000E+00

BASE CASE, 1,3-DICHLOROBENZENE, PLANT AREA FILE =PP13DB.BTC

3 8 1655

DAYS	UG/L		
0.100000E-29	0.000000		
5555.56	0.000000		
11111.1	0.000000		
16666.7	0.000000		
22222.2	0.000000		
27777.8	0.000000	288889.	33043.8
33333.3	0.000000	294444.	33164.8
38888.9	0.000000	300000.	33218.6 ✓
44444.4	0.158787	305556.	33208.4
50000.0	0.909716	311111.	33137.7
55555.6	3.68848	316667.	33009.8
61111.1	11.5981	322222.	32828.4
66666.7	30.0934	327778.	32597.0
72222.2	67.2462	333333.	32319.1
77777.8	133.771	338889.	31998.3
83333.3	242.259	344444.	31638.1
88888.9	406.398	350000.	31241.7
94444.4	639.917	355556.	30812.5
100000.	955.585	361111.	30353.7
105556.	1364.34	366667.	29868.3
111111.	1874.62	372222.	29359.4
116667.	2491.93	377778.	28829.7
122222.	3218.65	383333.	28281.8
127778.	4054.05	388889.	27718.5
133333.	4994.40	394444.	27142.0
138889.	6033.34	400000.	26554.7
144444.	7162.24	405556.	25958.8
150000.	8370.58	411111.	25356.1
155556.	9646.46	416667.	24748.6
161111.	10977.0	422222.	24138.1
166667.	12348.8	427778.	23526.2
172222.	13748.1	433333.	22914.3
177778.	15161.6	438889.	22303.9
183333.	16576.2	444444.	21696.1
188889.	17979.4	450000.	21092.3
194444.	19359.7	455556.	20493.4
200000.	20706.3	461111.	19900.5
205556.	22009.8	466667.	19314.3
211111.	23261.5	472222.	18735.6
216667.	24454.2	477778.	18165.2
222222.	25581.5	483333.	17603.7
227778.	26638.3	488889.	17051.6
233333.	27620.3	494444.	16509.3
238889.	28524.6	500000.	15977.4
244444.	29348.8	505556.	15456.1
250000.	30091.6	511111.	14945.7
255556.	30752.5	516667.	14446.5
261111.	31331.5	522222.	13958.6
266667.	31829.4	527778.	13482.3
272222.	32247.6	533333.	13017.6
277778.	32587.9	538889.	12564.5
283333.	32852.4	544444.	12123.2
		550000.	11693.6

3 8 1656

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version 4.0, 1992.

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Title: BASE CASE, 1,4-DICHLOROBENZENE PLANT AREA FILE = PP14DB

Solubility (mg/l): 0.87000E+02
Recharge rate (cm/hr).....: 0.92800E-03
Sorption constant (cc/g).....: 0.43100E+01
Saturated water content: 0.35000E+00
Solid-phase decay (/hr): 0.00000E+00
Liquid-phase decay (/hr): 0.00000E+00
Curve coefficient: 0.40000E+01
Bulk density (g/cc).....: 0.17200E+01
Dispersion coefficient (cm^2/hr)....: 0.38500E+00
Saturated hydraulic conductivity: 0.38100E+02
Minimum depth (cm).....: 0.00000E+00
Maximum depth (cm).....: 0.55000E+03
Minimum time (day).....: 0.00000E+00
Maximum time (day).....: 0.55000E+06

For application 1 the active ingredient (ai) applied is 0.195E+04 kg ai/ha,
and has been applied 0.100E+01 days prior to recharge

Results

Projected water content: 0.133E+00
Pore water velocity [cm/hr]: 0.696E-02
Pollutant velocity [cm/hr]: 0.123E-03
Length of pollutant slug [cm]: 0.297E+02
Mass decayed prior to recharge [kg]: 0.000E+00

DAYS	UG/L		
0.100000E-29	0.000000		
5555.56	0.000000		
11111.1	0.000000		
16666.7	0.000000		
22222.2	0.000000	288889.	2164.03
27777.8	0.388920E-01	294444.	2054.98
33333.3	0.477076	300000.	1949.45
38888.9	3.26434	305556.	1847.60
44444.4	13.4768	311111.	1749.51
50000.0	39.7010	316667.	1655.22
55555.6	92.4386	322222.	1564.78
61111.1	181.385	327778.	1478.15
66666.7	313.146	333333.	1395.33
72222.2	490.003	338889.	1316.26
77777.8	709.865	344444.	1240.87
83333.3	967.022	350000.	1169.09
88888.9	1253.25	355556.	1100.82
94444.4	1559.02	361111.	1035.97
100000.	1874.46	366667.	974.427
105556.	2190.18	372222.	916.086
111111.	2497.77	377778.	860.828
116667.	2790.14	383333.	808.537
122222.	3061.58	388889.	759.100
127778.	3307.83	394444.	712.391
133333.	3525.94	400000.	668.290
138889.	3714.13	405556.	626.685
144444.	3871.69	411111.	587.459
150000.	3998.70	416667.	550.499
155556.	4095.94	422222.	515.695
161111.	4164.71	427778.	482.938
166667.	4206.70	433333.	452.128
172222.	4223.86 ✓	438889.	423.163
177778.	4218.32	444444.	395.936
183333.	4192.28	450000.	370.369
188889.	4147.96	455556.	346.365
194444.	4087.53	461111.	323.833
200000.	4013.11	466667.	302.697
205556.	3926.73	472222.	282.877
211111.	3830.29	477778.	264.297
216667.	3725.54	483333.	246.887
222222.	3614.11	488889.	230.573
227778.	3497.47	494444.	215.299
233333.	3376.97	500000.	200.999
238889.	3253.80	505556.	187.615
244444.	3129.04	511111.	175.089
250000.	3003.63	516667.	163.375
255556.	2878.38	522222.	152.420
261111.	2754.02	527778.	142.176
266667.	2631.17	533333.	132.601
272222.	2510.34	538889.	123.653
277778.	2391.98	544444.	115.294
283333.	2276.44	550000.	107.482

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version 4.0, 1992.

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Title: BASE CASE, 1,2,4-TRICHLOROBENZENE PLANT AREA FILE PP124B.INP

Solubility (mg/l): 0.48800E+02
Recharge rate (cm/hr).....: 0.92800E-03
Sorption constant (cc/g)....: 0.48690E+02
Saturated water content: 0.35000E+00
Solid-phase decay (/hr): 0.00000E+00
Liquid-phase decay (/hr): 0.00000E+00
Curve coefficient: 0.40000E+01
Bulk density (g/cc).....: 0.17200E+01
Dispersion coefficient (cm^2/hr)....: 0.38500E+00
Saturated hydraulic conductivity: 0.38100E+02
Minimum depth (cm).....: 0.00000E+00
Maximum depth (cm).....: 0.55000E+03
Minimum time (day)....: 0.00000E+00
Maximum time (day).....: 0.50000E+07

For application 1 the active ingredient (ai) applied is 0.201E+05 kg ai/ha,
and has been applied 0.100E+01 days prior to recharge

Results

Projected water content: 0.133E+00
Pore water velocity [cm/hr]: 0.696E-02
Pollutant velocity [cm/hr]: 0.111E-04
Length of pollutant slug [cm]: 0.491E+02
Mass decayed prior to recharge [kg]: 0.000E+00

DAYS	UG/L	
0.100000E-29	0.000000	
50505.1	0.000000	
101010.	0.000000	
151515.	0.000000	
202020.	0.000000	0.262626E+07 3118.96
252525.	0.000000	0.267677E+07 3027.68
303030.	0.000000	0.272727E+07 2935.20
353535.	0.184703	0.277778E+07 2842.01
404040.	1.01805	0.282828E+07 2748.55
454545.	4.08964	0.287879E+07 2655.22
505051.	12.2602	0.292929E+07 2562.38
555556.	29.7124	0.297980E+07 2470.32
606061.	61.3810	0.303030E+07 2379.34
656566.	112.138	0.308081E+07 2289.66
707071.	186.012	0.313131E+07 2201.50
757576.	285.613	0.318182E+07 2115.02
808081.	411.884	0.323232E+07 2030.40
858586.	564.093	0.328283E+07 1947.73
909091.	740.049	0.333333E+07 1867.14
959596.	936.407	0.338384E+07 1788.71
0.101010E+07	1149.05	0.343434E+07 1712.49
0.106061E+07	1373.40	0.348485E+07 1638.53
0.111111E+07	1604.77	0.353535E+07 1566.86
0.116162E+07	1838.58	0.358586E+07 1497.52
0.121212E+07	2070.56	0.363636E+07 1430.49
0.126263E+07	2296.84	0.368687E+07 1365.78
0.131313E+07	2514.09	0.373737E+07 1303.37
0.136364E+07	2719.52	0.378788E+07 1243.24
0.141414E+07	2910.86	0.383838E+07 1185.36
0.146465E+07	3086.39	0.388889E+07 1129.70
0.151515E+07	3244.87	0.393939E+07 1076.22
0.156566E+07	3385.51	0.398990E+07 1024.88
0.161616E+07	3507.90	0.404040E+07 975.615
0.166667E+07	3611.99	0.409091E+07 928.392
0.171717E+07	3697.99	0.414141E+07 883.152
0.176768E+07	3766.38	0.419192E+07 839.834
0.181818E+07	3817.79	0.424242E+07 798.392
0.186869E+07	3853.03	0.429293E+07 758.761
0.191919E+07	3873.02	0.434343E+07 720.887
0.196970E+07	3878.74	0.439394E+07 684.707
0.202020E+07	3871.22	0.444444E+07 650.166
0.207071E+07	3851.55	0.449495E+07 617.204
0.212121E+07	3820.79	0.454545E+07 585.767
0.217172E+07	3779.99	0.459596E+07 555.794
0.222222E+07	3730.20	0.464646E+07 527.231
0.227273E+07	3672.41	0.469697E+07 500.023
0.232323E+07	3607.61	0.474747E+07 474.112
0.237374E+07	3536.70	0.479798E+07 449.452
0.242424E+07	3460.56	0.484848E+07 425.984
0.247475E+07	3379.98	0.489899E+07 403.662
0.252525E+07	3295.73	0.494949E+07 382.437
0.257576E+07	3208.51	0.500000E+07 362.262

Woodward-Clyde

3 8 164

FORMER CPC PLANT AREA

**PESTAN RUNS
WITH DECAY**

PESTAN
version 4.0, 1992.

3 8 166:

Developed by :

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Title: W/DECAY , BENZENE PLANT AREA FILE = PPBEN1

Solubility (mg/l): 0.17910E+04
Recharge rate (cm/hr).....: 0.92800E-03
Sorption constant (cc/g).....: 0.70000E+00
Saturated water content: 0.35000E+00
Solid-phase decay (/hr): 0.00000E+00
Liquid-phase decay (/hr): 0.36000E-04
Curve coefficient: 0.40000E+01
Bulk density (g/cc).....: 0.17200E+01
Dispersion coefficient (cm²/hr).....: 0.38500E+00
Saturated hydraulic conductivity: 0.38100E+02
Minimum depth (cm).....: 0.00000E+00
Maximum depth (cm).....: 0.55000E+03
Minimum time (day).....: 0.00000E+00
Maximum time (day).....: 0.10000E+06

For application 1 the active ingredient (ai) applied is 0.190E+03 kg ai/ha,
and has been applied 0.100E+01 days prior to recharge

Results

Projected water content: 0.133E+00
Pore water velocity [cm/hr]: 0.696E-02
Pollutant velocity [cm/hr]: 0.694E-03
Length of pollutant slug [cm]: 0.793E+00
Mass decayed prior to recharge [kg]: 0.000E+00

W/DECAY BENZENE PLANT AREA FILE = PPBEN1

3 8 166?

DAYS	UG/L		
0.100000E-29	0.000000		
1010.10	0.000000		
2020.20	0.000000		
3030.30	0.000000		
4040.40	0.000000		
5050.50	0.345547E-01	52525.3	11.4944
6060.61	0.380120	53535.4	9.96230
7070.71	2.06172	54545.5	8.62662
8080.81	6.94776	55555.6	7.46399
9090.91	17.2527	56565.7	6.45279
10101.0	34.3382	57575.8	5.57440
11111.1	58.3423	58585.9	4.81169
12121.2	87.9603	59596.0	4.15061
13131.3	120.977	60606.1	3.57784
14141.4	154.930	61616.2	3.08256
15151.5	187.398	62626.3	2.65396
16161.6	216.410	63636.4	2.28406
17171.7	240.628	64646.5	1.96431
18181.8	259.232	65656.6	1.68853
19191.9	271.994	66666.7	1.45108
20202.0	279.032	67676.8	1.24619
21212.1	280.854 ✓	68686.9	1.06983
22222.2	278.049	69697.0	0.918040
23232.3	271.358	70707.1	0.787630
24242.4	261.555	71717.2	0.675242
25252.5	249.366	72727.3	0.578862
26262.6	235.463	73737.4	0.496001
27272.7	220.442	74747.5	0.424982
28282.8	204.819	75757.6	0.363922
29292.9	189.012	76767.7	0.311452
30303.0	173.367	77777.8	0.266583
31313.1	158.149	78787.9	0.228115
32323.2	143.555	79798.0	0.195149
33333.3	129.724	80808.1	0.166854
34343.4	116.747	81818.2	0.142663
35353.5	104.680	82828.3	0.121943
36363.6	93.5412	83838.4	0.104232
37373.7	83.3288	84848.5	0.890203E-01
38383.8	74.0212	85858.6	0.760470E-01
39393.9	65.5790	86868.7	0.649792E-01
40404.0	57.9606	87878.8	0.554762E-01
41414.1	51.1117	88888.9	0.473588E-01
42424.2	44.9801	89899.0	0.404178E-01
43434.3	39.5078	90909.1	0.345175E-01
44444.4	34.6396	91919.2	0.294367E-01
45454.5	30.3222	92929.3	0.251239E-01
46464.6	26.4998	93939.4	0.214074E-01
47474.7	23.1271	94949.5	0.182710E-01
48484.8	20.1570	95959.6	0.155775E-01
49494.9	17.5453	96969.7	0.132943E-01
50505.1	15.2557	97979.8	0.113298E-01
51515.2	13.2493	98989.9	0.965337E-02
		100000.	0.823602E-02

| PESTAN
| version 4.0, 1992.
|
| Developed by :
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| Ada, OK 74820
|

Title: W/DECAY CHLOROBENZENE PLANT AREA FILE = PPCHB1

Solubility (mg/l): 0.47170E+03
Recharge rate (cm/hr).....: 0.92800E-03
Sorption constant (cc/g)....: 0.18800E+01
Saturated water content: 0.35000E+00
Solid-phase decay (/hr): 0.00000E+00
Liquid-phase decay (/hr): 0.38600E-05 ✓
Curve coefficient: 0.40000E+01
Bulk density (g/cc).....: 0.17200E+01
Dispersion coefficient (cm^2/hr)....: 0.38500E+00
Saturated hydraulic conductivity: 0.38100E+02
Minimum depth (cm).....: 0.00000E+00
Maximum depth (cm).....: 0.55000E+03
Minimum time (day).....: 0.00000E+00
Maximum time (day).....: 0.10000E+06

For application 1 the active ingredient (ai) applied is 0.150E+04 kg ai/ha,
and has been applied 0.100E+01 days prior to recharge ✓

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Results

Projected water content: 0.133E+00
Pore water velocity [cm/hr]: 0.696E-02
Pollutant velocity [cm/hr]: 0.276E-03
Length of pollutant slug [cm]: 0.944E+01
Mass decayed prior to recharge [kg]: 0.000E+00

DAYS	UG/L		
0.100000E-29	0.000000		
1010.10	0.000000		
2020.20	0.000000		
3030.30	0.000000		
4040.40	0.000000	52525.3	4276.28
5050.50	0.000000	53535.4	4415.84
6060.61	0.000000	54545.5	4548.02
7070.71	0.000000	55555.6	4672.57
8080.81	0.000000	56565.7	4789.33
9090.91	0.000000	57575.8	4898.17
10101.0	0.000000	58585.9	4998.98
11111.1	0.000000	59596.0	5091.73
12121.2	0.000000	60606.1	5176.46
13131.3	0.187558	61616.2	5253.18
14141.4	0.573940	62626.3	5321.99
15151.5	1.43620	63636.4	5382.99
16161.6	3.20625	64646.5	5436.30
17171.7	6.46799	65656.6	5482.08
18181.8	11.9807	66666.7	5520.52
19191.9	20.7152	67676.8	5551.84
20202.0	33.7449	68686.9	5576.22
21212.1	52.2576	69697.0	5593.89
22222.2	77.4228	70707.1	5605.10
23232.3	110.431	71717.2 ✓	5610.08 ✓
24242.4	152.365	72727.3	5609.11
25252.5	204.150	73737.4	5602.41
26262.6	266.555	74747.5	5590.25
27272.7	340.134	75757.6	5572.90
28282.8	425.206	76767.7	5550.62
29292.9	521.891	77777.8	5523.65
30303.0	630.095	78787.9	5492.28
31313.1	749.499	79798.0	5456.74
32323.2	879.612	80808.1	5417.29
33333.3	1019.75	81818.2	5374.17
34343.4	1169.14	82828.3	5327.63
35353.5	1326.86	83838.4	5277.89
36363.6	1491.88	84848.5	5225.17
37373.7	1663.17	85858.6	5169.71
38383.8	1839.62	86868.7	5111.72
39393.9	2020.09	87878.8	5051.42
40404.0	2203.47	88888.9	4989.01
41414.1	2388.63	89899.0	4924.68
42424.2	2574.52	90909.1	4858.62
43434.3	2760.12	91919.2	4790.99
44444.4	2944.41	92929.3	4721.99
45454.5	3126.51	93939.4	4651.76
46464.6	3305.53	94949.5	4580.47
47474.7	3480.70	95959.6	4508.27
48484.8	3651.30	96969.7	4435.30
49494.9	3816.70	97979.8	4361.68
50505.1	3976.32	98989.9	4287.56
51515.2	4129.67	100000.	4213.07

PESTAN
version 4.0, 1992.

Developed by :

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Title: W/LIQUID PHASE DECAY 1,2-DICHLOROBENZENE

Solubility (mg/l): 0.15600E+03
Recharge rate (cm/hr).....: 0.92800E-03
Sorption constant (cc/g)....: 0.86100E+01
Saturated water content: 0.35000E+00
Solid-phase decay (/hr): 0.00000E+00
Liquid-phase decay (/hr): 0.32000E-05 ✓
Curve coefficient: 0.40000E+01
Bulk density (g/cc).....: 0.17200E+01
Dispersion coefficient (cm^2/hr)....: 0.38500E+00
Saturated hydraulic conductivity: 0.38100E+02
Minimum depth (cm).....: 0.00000E+00
Maximum depth (cm).....: 0.55000E+03
Minimum time (day).....: 0.00000E+00
Maximum time (day).....: 0.55000E+06

For application 1 the active ingredient (ai) applied is 0.432E+05 kg ai/ha,
and has been applied 0.100E+01 days prior to recharge

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Results

Projected water content: 0.133E+00
Pore water velocity [cm/hr]: 0.696E-02
Pollutant velocity [cm/hr]: 0.621E-04
Length of pollutant slug [cm]: 0.185E+03
Mass decayed prior to recharge [kg]: 0.000E+00

DAYS	UG/L		
0.100000E-29	0.000000		
5555.56	0.000000		
11111.1	0.000000		
16666.7	0.000000		
22222.2	0.000000	288889.	26986.8
27777.8	0.000000	294444.	27769.3
33333.3	0.000000	300000.	28500.3
38888.9	0.000000	305556.	29178.8
44444.4	0.000000	311111.	29803.8
50000.0	0.000000	316667.	30374.8
55555.6	0.805607E-01	322222.	30891.8
61111.1	0.361146	327778.	31354.8
66666.7	1.27920	333333.	31764.2
72222.2	3.73010	338889.	32120.7
77777.8	9.32731	344444.	32425.2
83333.3	20.6125	350000.	32678.8
88888.9	41.2129	355556.	32882.6
94444.4	75.7065	361111.	33038.0
100000.	129.908	366667.	33146.7
105556.	210.226	372222.	33210.1
111111.	323.624	377778. ✓	33230.0 ✓
116667.	477.243	383333.	33208.2
122222.	678.054	388889.	33146.5
127778.	932.567	394444.	33046.8
133333.	1246.50	400000.	32910.9
138889.	1624.60	405556.	32740.8
144444.	2070.43	411111.	32538.4
150000.	2586.31	416667.	32305.6
155556.	3173.25	422222.	32044.3
161111.	3830.92	427778.	31756.4
166667.	4557.77	433333.	31443.6
172222.	5351.06	438889.	31107.9
177778.	6206.98	444444.	30750.9
183333.	7120.86	450000.	30374.4
188889.	8087.18	455556.	29980.1
194444.	9099.85	461111.	29569.5
200000.	10152.3	466667.	29144.3
205556.	11237.5	472222.	28705.8
211111.	12348.6	477778.	28255.6
216667.	13478.1	483333.	27795.1
222222.	14619.1	488889.	27325.5
227778.	15764.5	494444.	26848.1
233333.	16907.6	500000.	26364.2
238889.	18041.8	505556.	25874.8
244444.	19161.1	511111.	25381.1
250000.	20259.7	516667.	24884.0
255556.	21332.4	522222.	24384.6
261111.	22374.3	527778.	23883.8
266667.	23381.1	533333.	23382.3
272222.	24348.9	538889.	22881.1
277778.	25274.4	544444.	22380.9
283333.	26154.5	550000.	21882.3

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Title: WITH LIQUID PHASE DECAY, 1,3-DICHLOROBENZENE PP13D1

Solubility (mg/l): 0.11100E+03
Recharge rate (cm/hr).....: 0.92800E-03
Sorption constant (cc/g)....: 0.64600E+01
Saturated water content: 0.35000E+00
Solid-phase decay (/hr): 0.00000E+00
Liquid-phase decay (/hr): 0.32000E-05 ✓
Curve coefficient: 0.40000E+01
Bulk density (g/cc).....: 0.17200E+01
Dispersion coefficient (cm^2/hr)....: 0.38500E+00
Saturated hydraulic conductivity: 0.38100E+02
Minimum depth (cm).....: 0.00000E+00
Maximum depth (cm).....: 0.55000E+03
Minimum time (day).....: 0.00000E+00
Maximum time (day).....: 0.55000E+06

For application 1 the active ingredient (ai) applied is 0.354E+05 kg ai/ha,
and has been applied 0.100E+01 days prior to recharge

Results

Projected water content: 0.133E+00
Pore water velocity [cm/hr]: 0.696E-02
Pollutant velocity [cm/hr]: 0.825E-04
Length of pollutant slug [cm]: 0.284E+03
Mass decayed prior to recharge [kg]: 0.000E+00

DAYS	UG/L		
0.100000E-29	0.000000		
5555.56	0.000000		
11111.1	0.000000		
16666.7	0.000000		
22222.2	0.000000	288889.	32927.2
27777.8	0.000000	294444.	33113.1
33333.3	0.000000	300000.	33228.3
38888.9	0.000000	305556. V	33275.4 V
44444.4	0.152492	311111.	33257.8
50000.0	0.869247	316667.	33178.5
55555.6	3.50663	322222.	33041.0
61111.1	10.9706	327778.	32848.7
66666.7	28.3218	333333.	32605.1
72222.2	63.0364	338889.	32313.9
77777.8	124.870	344444.	31978.4
83333.3	225.246	350000.	31602.2
88888.9	376.570	355556.	31188.8
94444.4	591.233	361111.	30741.4
100000.	880.805	366667.	30263.4
105556.	1255.34	372222.	29757.9
111111.	1722.78	377778.	29228.0
116667.	2288.67	383333.	28676.6
122222.	2955.93	388889.	28106.6
127778.	3724.84	394444.	27520.6
133333.	4593.19	400000.	26921.1
138889.	5556.40	405556.	26310.6
144444.	6607.88	411111.	25691.2
150000.	7739.28	416667.	25065.3
155556.	8940.82	422222.	24434.6
161111.	10201.7	427778.	23801.1
166667.	11510.2	433333.	23166.5
172222.	12854.5	438889.	22532.5
177778.	14222.3	444444.	21900.4
183333.	15601.4	450000.	21271.6
188889.	16980.2	455556.	20647.4
194444.	18347.4	461111.	20028.8
200000.	19692.4	466667.	19417.0
205556.	21005.2	472222.	18812.8
211111.	22277.0	477778.	18217.1
216667.	23499.6	483333.	17630.5
222222.	24666.0	488889.	17053.8
227778.	25770.0	494444.	16487.4
233333.	26806.4	500000.	15932.0
238889.	27770.9	505556.	15387.8
244444.	28660.3	511111.	14855.3
250000.	29472.0	516667.	14334.8
255556.	30204.4	522222.	13826.5
261111.	30856.6	527778.	13330.6
266667.	31428.4	533333.	12847.1
272222.	31920.1	538889.	12376.3
277778.	32332.8	544444.	11918.2
283333.	32667.8	550000.	11472.7

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Title: W/LIQUID PHASE DECAY, 1,4-DICHLOROBENZENE

Solubility (mg/l): 0.87000E+02
 Recharge rate (cm/hr).....: 0.92800E-03
 Sorption constant (cc/g).....: 0.43100E+01
 Saturated water content: 0.35000E+00
 Solid-phase decay (/hr): 0.00000E+00
 Liquid-phase decay (/hr): 0.32000E-05✓
 Curve coefficient: 0.40000E+01
 Bulk density (g/cc).....: 0.17200E+01
 Dispersion coefficient (cm^2/hr)....: 0.38500E+00
 Saturated hydraulic conductivity: 0.38100E+02
 Minimum depth (cm).....: 0.00000E+00
 Maximum depth (cm).....: 0.55000E+03
 Minimum time (day).....: 0.00000E+00
 Maximum time (day).....: 0.55000E+06

For application 1 the active ingredient (ai) applied is 0.250E+04 kg ai/ha,
 and has been applied 0.100E+01 days prior to recharge

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 Results

Projected water content: 0.133E+00
 Pore water velocity [cm/hr]: 0.696E-02
 Pollutant velocity [cm/hr]: 0.123E-03
 Length of pollutant slug [cm]: 0.381E+02
 Mass decayed prior to recharge [kg]: 0.000E+00

W/LIQUID PHASE DECAY, 1,4 DICHLOROBENZENE, PLANT AREA FILE PP14D1.BTC

3 8 1670

DAYS	UG/L		
0.10000E-29	0.000000		
5555.56	0.000000		
11111.1	0.000000		
16666.7	0.000000		
22222.2	0.000000	288889.	1898.99
27777.8	0.374543E-01	294444.	1790.64
33333.3	0.508033	300000.	1686.75
38888.9	3.51724	305556.	1587.36
44444.4	14.6322	311111.	1492.47
50000.0	43.3347	316667.	1402.04
55555.6	101.219	322222.	1316.03
61111.1	198.942	327778.	1234.34
66666.7	343.596	333333.	1156.88
72222.2	537.322	338889.	1083.54
77777.8	777.290	344444.	1014.18
83333.3	1056.60	350000.	948.679
88888.9	1365.61	355556.	886.881
94444.4	1693.31	361111.	828.646
100000.	2028.50	366667.	773.821
105556.	2360.66	372222.	722.258
111111.	2680.54	377778.	673.802
116667.	2980.51	383333.	628.310
122222.	3254.63	388889.	585.631
127778.	3498.63	394444.	545.623
133333.	3709.76	400000.	508.144
138889.	3886.62	405556.	473.059
144444.	4028.96	411111.	440.234
150000.	4137.43	416667.	409.542
155556.	4213.39	422222.	380.863
161111.	4258.75	427778.	354.080
166667..	4275.78	433333.	329.079
172222.	4266.97	438889.	305.754
177778.	4234.96	444444.	283.997
183333.	4182.42	450000.	263.720
188889.	4111.97	455556.	244.828
194444.	4026.11	461111.	227.232
200000.	3927.27	466667.	210.848
205556.	3817.70	472222.	195.602
211111.	3699.49	477778.	181.418
216667.	3574.53	483333.	168.225
222222.	3444.54	488889.	155.960
227778.	3311.07	494444.	144.561
233333.	3175.47	500000.	133.970
238889.	3038.95	505556.	124.132
244444.	2902.56	511111.	114.995
250000.	2767.20	516667.	106.513
255556.	2633.64	522222.	98.6412
261111.	2502.51	527778.	91.3353
266667.	2374.36	533333.	84.5588
272222.	2249.62	538889.	78.2721
277778.	2128.65	544444.	72.4443
283333.	2011.70	550000.	67.0389

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Title: W/DECAY 1,2,4-TRICHLOROBENZENE PLANT AREA PP1241

Solubility (mg/l): 0.48800E+02
Recharge rate (cm/hr).....: 0.92800E-03
Sorption constant (cc/g)....: 0.48690E+02
Saturated water content: 0.35000E+00
Solid-phase decay (/hr): 0.00000E+00
Liquid-phase decay (/hr): 0.32000E-05 ✓
Curve coefficient: 0.40000E+01
Bulk density (g/cc).....: 0.17200E+01
Dispersion coefficient (cm^2/hr).....: 0.38500E+00
Saturated hydraulic conductivity: 0.38100E+02
Minimum depth (cm).....: 0.00000E+00
Maximum depth (cm).....: 0.55000E+03
Minimum time (day).....: 0.00000E+00
Maximum time (day).....: 0.50000E+07

For application 1 the active ingredient (ai) applied is 0.260E+05 kg ai/ha,
and has been applied 0.100E+01 days prior to recharge

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Results

Projected water content: 0.133E+00
Pore water velocity [cm/hr]: 0.696E-02
Pollutant velocity [cm/hr]: 0.111E-04
Length of pollutant slug [cm]: 0.635E+02
Mass decayed prior to recharge [kg]: 0.000E+00

W/DECAY 1,2,4 TRICHLOROBENZENE PLANT AREA PP1241

3 8 1672

DAYS	UG/L		
0.100000E-29	0.000000		
50505.1	0.000000		
101010.	0.000000		
151515.	0.000000		
202020.	0.000000	0.262626E+07	2959.00
252525.	0.000000	0.267677E+07	2857.79
303030.	0.000000	0.272727E+07	2756.31
353535.	0.176906	0.277778E+07	2655.04
404040.	1.03830	0.282828E+07	2554.41
454545.	4.20611	0.287879E+07	2454.79
505051.	12.7118	0.292929E+07	2356.52
555556.	31.0215	0.297980E+07	2259.87
606061.	64.4538	0.303030E+07	2165.08
656566.	118.306	0.308081E+07	2072.37
707071.	196.977	0.313131E+07	1981.90
757576.	303.325	0.318182E+07	1893.81
808081.	438.349	0.323232E+07	1808.22
858586.	601.191	0.328283E+07	1725.19
909091.	789.353	0.333333E+07	1644.81
959596.	999.046	0.338384E+07	1567.10
0.101010E+07	1225.62	0.343434E+07	1492.09
0.106061E+07	1463.92	0.348485E+07	1419.80
0.111111E+07	1708.70	0.353535E+07	1350.21
0.116162E+07	1954.84	0.358586E+07	1283.31
0.121212E+07	2197.62	0.363636E+07	1219.07
0.126263E+07	2432.80	0.368687E+07	1157.44
0.131313E+07	2656.76	0.373737E+07	1098.38
0.136364E+07	2866.51	0.378788E+07	1041.85
0.141414E+07	3059.70	0.383838E+07	987.774
0.146465E+07	3234.57	0.388889E+07	936.100
0.151515E+07	3389.94	0.393939E+07	886.760
0.156566E+07	3525.12	0.398990E+07	839.683
0.161616E+07	3639.88	0.404040E+07	794.801
0.166667E+07	3734.33	0.409091E+07	752.040
0.171717E+07	3808.92	0.414141E+07	711.327
0.176768E+07	3864.34	0.419192E+07	672.589
0.181818E+07	3901.50	0.424242E+07	635.752
0.186869E+07	3921.42	0.429293E+07	600.743
0.191919E+07	3925.27 ✓	0.434343E+07	567.490
0.196970E+07	3914.27	0.439394E+07	535.920
0.202020E+07	3889.66	0.444444E+07	505.962
0.207071E+07	3852.72	0.449495E+07	477.551
0.212121E+07	3804.70	0.454545E+07	450.617
0.217172E+07	3746.83	0.459596E+07	425.095
0.222222E+07	3680.30	0.464646E+07	400.920
0.227273E+07	3606.24	0.469697E+07	378.031
0.232323E+07	3525.73	0.474747E+07	356.368
0.237374E+07	3439.77	0.479798E+07	335.873
0.242424E+07	3349.33	0.484848E+07	316.488
0.247475E+07	3255.26	0.489899E+07	298.162
0.252525E+07	3158.37	0.494949E+07	280.841
0.257576E+07	3059.39	0.500000E+07	264.477